

DEPARTMENT OF DEFENSE  
IN-HOUSE RDT&E ACTIVITIES



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FY94

Management Analysis Report

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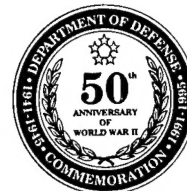
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OFFICE OF THE DIRECTOR OF  
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JAN 17 1996

MEMORANDUM FOR DEFENSE TECHNICAL INFORMATION CENTER  
(Attention: Ms. Gretchen Schlag)

SUBJECT: Distribution of the Fiscal Year 1994 DoD In-House RDT&E Activities Annual Report (RCS DD-DR&E(A)1041)

In accordance with DoD Directive 5230.24, and prior coordination with your organization, I am forwarding copies of the just-prepared FY-94 DoD In-House RDT&E Activities Annual Report for addition to your inventory and distribution controls. We have previously provided DTIC with the FY-91, FY-92 and FY-93 editions of this report for distribution, and anticipate publishing the FY-95 edition in spring 1996.

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Lance A. Davis  
Deputy Director, Defense Research and Engineering  
(Laboratory Management and Technology Transition)

Attachments



# DEPARTMENT OF DEFENSE IN-HOUSE RDT&E ACTIVITIES REPORT

for  
Fiscal Year 1994

**DTIC QUALITY INSPECTED 2**

Prepared for:

The Office of the Secretary of Defense  
Director, Defense  
Research and Engineering  
The Pentagon  
Washington, DC 20301

## FOREWORD

### Introduction

The DoD RDT&E In-House Activities Report was started in the mid-1960s by OSD's Office of Laboratory Management at the request of the then DDR&E, Dr. John Foster. The annual report has been produced in official form since 1966, and is the subject of a Tri-Service regulation dated October 1, 1981: AR 70-63; NAVCOMPINST 7044.5E; and, AFR 80-26.

The DoD RDT&E In-House Activities Annual Report and database project is the DDR&E central source of information on laboratory status, and serves four essential purposes: (1) since inception, it has been the only compilation of statistics organized by location on DoD RDT&E Activities; (2) it provides the basis for prompt responses to many general queries about DoD RDT&E Activities, without recourse to special surveys, etc.; (3) it provides an historical database which can be utilized for tracking consolidations and organizational changes, and for special analyses and trend studies; and, (4) it provides insight into the technical and organizational environment of the DoD laboratories and the financial, manpower and facility investments made in them.

The Office of the Deputy Director of Defense Research and Engineering for Laboratory Management and Technology Transition leads a Steering Group which is responsible for the preparation and oversight of the report and its underlying database. The Steering Group is composed of representatives from the offices of the Director of Defense Research and Engineering, the Deputy Assistant Secretary of the Army for Research and Technology, the Chief of Naval Research, the Deputy Assistant Secretary of the Air Force (Research and Engineering), the Director of the Defense Nuclear Agency and the Under Secretary of Defense (Comptroller).

A DoD organizational entity is considered to be a "DoD RDT&E Activity" when it is owned and operated by the Government, and a minimum of 25% of its total effort is devoted to research, exploratory or advanced development, engineering development, demonstration/validation, systems or operational support, or some combination thereof. Examples are a research laboratory, RD&E center, test activity, or multi-functional entity such as a "warfare center". An "In-House" RDT&E Activity is an organization where a minimum of 25% of the in-house manpower and/or 25% of the obligational authority used is devoted to in-house research, exploratory or advanced development, engineering development, etc.

### Structure of Report

Each **In-House RDT&E Activity** of the DoD is **described** in a standard multi-page format in this year's edition of the report. Funding data are broken down into the standard RDT&E sub-categories: 6.1 - Research, 6.2 - Exploratory Development, 6.3 - Advanced Development, 6.4 - Demonstration & Validation, 6.5 - Engineering and Manufacturing Development, 6.6 - Management Support, 6.7 - Operational Systems Development, and Non-DoD.

A **partial organization chart**, entitled "Abbreviated Functional Chart - Technical Organizations", **appears** for each Activity to provide an overview of its technical operations. Activities are listed alphabetically within their respective military departments. Selected data are summarized in tables in the first section of the report. Following the tables are the sections which cover the Army, Navy, Air Force and the Defense Nuclear Agency Activities (e.g. Laboratories).

**Organizational changes** for FY94 **appear** in Appendix A. Appendix B contains definitions of the data elements displayed in this report. Appendix C defines selected abbreviations and acronyms. All zero-filled report data fields reflect a zero amount reported.

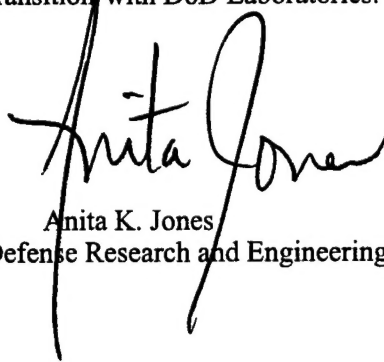
Every effort has been made to provide accurate information. Each submission was reviewed and approved by the head of the Activity. All numbers and statements submitted by each Activity were then thoroughly examined by the members and staff of the Steering Group. Please note, though, that this

thoroughly examined by the members and staff of the Steering Group. Please note, though, that this report does not reflect the total DoD RDT&E program. It is also not an accounting or financial management document, but rather a "snapshot" of the operation of individual Activities. All funding data reflect total obligational authority received in FY94.

The report is used by numerous DoD organizations, as well as various committees of Congress, The Library of Congress and the General Accounting Office. The report provides easily accessible, comprehensive and accurate information without frequent querying of field Activities.

This publication should be given widespread distribution in the DoD Laboratories, both as an internal resources reference document at the Director and Commanding Officer level, and as a catalog of general activity at the bench level. It provides laboratory staff an opportunity to familiarize themselves with the functional capabilities of other DoD Laboratories, thereby encouraging scientists and engineers to communicate with their counterparts at other labs on problems of common interest.

In addition, this publication should be helpful to those in the private sector interested in exploring the potential for technology cooperation/transition with DoD Laboratories.



Anita K. Jones  
Director, Defense Research and Engineering

Note: For additional copies of this report, contact:

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TABLE 1. ARMY RDT&E ACTIVITIES, PROGRAM AND PERSONNEL DATA, FY 1994												
INSTALLATION	FUNDING DATA (MILLIONS \$)				PERSONNEL DATA							
	TOTALS		TOTALS RDT&E	IN-HOUSE RDT&E	TOTAL	TOTAL		PHD		ENG		
	TOTAL	IN-HOUSE				CIV	MIL	CIV	MIL	CIV	MIL	
Aeromedical Research Laboratory	9.397	9.275	5.808	5.686	71	44	11	10	3	6		
Armament RDEC	609.173	291.828	309.628	150.471	59	4,194	1	71	14	1,786		
Army Research Laboratory	467.418	252.695	408.350	249.391	111	3349	9	382	32	1378		
Army Space and Strategic Defense Cmd	646.979	32.111	641.796	31.721	107	1002	1	37	0	504		
Aviation RDEC	134.046	53.189	97.938	34.398	15	775	2	28	9	450		
Aviation Technical Test Center	42.443	24.697	22.152	12.584	90	136	0	0	47	44		
Cold Regions Research & Engineering Lab	43.280	28.595	23.273	13.392	3	268	0	43	3	71		
Cold Regions Test Center	10.193	9.120	6.493	5.420	75	38	0	0	6	8		
Combat Systems Test Activity	113.000	72.725	64.656	39.117	168	1019	0	7	12	310		
Comm-Electronics RDEC	548.451	165.479	286.450	87.647	122	2409	1	68	11	1461		
Construction Engineering Research Labs	90.318	37.954	50.602	24.024	1	383	0	52	1	177		
Dugway Proving Ground	87.181	48.379	56.181	35.379	72	562	0	19	14	72		
Edgewood RDEC	284.266	122.109	180.463	87.602	23	1101	3	77	14	552		
Electronic Proving Ground	45.400	23.885	22.453	11.724	294	150	1	2	22	70		
Engineer Waterways Experiment Station	307.541	216.382	292.710	201.551	5	1529	1	185	4	537		
Inst. of Surgical Research	16.059	16.059	9.642	9.642	200	55	22	6	9	17		
Matériel Systems Analysis Activity	41.277	28.864	32.034	21.919	23	414	0	12	15	304		
Med. Research Inst. of Chemical Defense	20.577	20.402	15.948	15.773	75	170	23	34	9	37		
Med. Research Inst. of Environ. Medicine	12.994	10.480	8.377	6.111	74	80	24	28	1	24		
Med. Research Inst. of Infectious Diseases	40.715	36.233	27.239	22.757	296	236	37	48	11	35		
Missile RDEC	425.981	116.640	217.703	68.885	24	2062	2	60	17	1265		
Natick RDEC	132.533	66.084	114.290	55.260	45	910	0	59	3	326		
OPTEC-Test and Experimentation Cmd	120.707	91.417	78.570	49.280	848	570	0	2	776	365		
Redstone Technical Test Center	54.000	4.100	32.600	3.600	0	164	0	0	0	97		
Rsrch Inst. for Behavioral & Social Sciences	35.692	19.594	34.254	18.180	10	208	1	99	8	27		
Simulation, Training & Instrmntn. Cmd	558.148	44.347	192.001	14.940	61	473	1	1	45	194		
Tank-Automotive RDEC	220.835	75.799	156.229	28.356	29	1333	0	24	26	696		
Topographic Engineering Center	79.590	29.933	27.295	17.019	10	423	0	14	3	252		
Walter Reed Army Inst. of Research	102.936	94.834	60.009	51.998	489	473	185	110	9	139		
White Sands Missile Range	263.414	183.863	181.706	139.658	538	2207	0	10	139	559		
Yuma Proving Ground	112.701	75.179	74.787	44.947	165	764	0	0	13	148		

TABLE 2. ARMY RDT&E ACTIVITIES, FACILITY DATA, FY 1994									
INSTALLATION	LOCATION	ACRES	SPACE AND PROPERTY				COST (MILLIONS \$)		
			SPACE (THOUSANDS OF SQUARE FEET)				REAL		
			LAB	ADMIN	OTHER	TOTAL	PROP	EQUIP	
Aeromedical Research Laboratory	Fort Rucker, AL	44	107.946	25.520	19.548	153.014	12.357	44.840	
Armament RDEC	Picatinny Arsenal, NJ	5,884	452.617	1,154.144	2,424.937	4,031.698	176.524	208.142	
Army Research Laboratory	Adelphi, MD	2,353	1,852.700	426.700	732.100	3,011.500	1,325.430	552.612	
Army Space and Strategic Defense Cmd	Arlington, VA	3,885	0.000	392.761	413.123	805.884	848.278	330.000	
Aviation RDEC	St. Louis, MO	0	108.852	64.741	14.730	188.323	6.602	26.359	
Aviation Technical Test Center	Fort Rucker, AL	0	0.000	93.000	229.000	322.000	3.500	169.124	
Cold Regions Research & Engineering Lab	Hanover, NH	129	211.655	58.850	64.510	335.015	34.000	25.000	
Cold Regions Test Center	Fort Greely, AK	0	1.400	18.200	198.400	218.000	14.300	23.109	
Combat Systems Test Activity	Aberdeen Proving Grd, MD	56,707	161.507	164.869	909.423	1,235.799	56.000	202.485	
Comm-Electronics RDEC	Ft. Monmouth, NJ	2,299	421.400	361.900	16.900	800.200	65.600	243.100	
Construction Engineering Research Labs	Champaign, IL	33	118.896	60.428	29.449	208.773	0.000	20.189	
Dugway Proving Ground	Dugway, UT	798,855	219.000	189.000	2,163.000	2,571.000	160.000	110.000	
Edgewood RDEC	Aberdeen PG, MD	0	936.000	216.000	310.000	1,462.000	70.100	124.100	
Electronic Proving Ground	Fort Huachuca, AZ	29,139	273.000	14.680	14.480	302.160	44.198	135.701	
Engineer Waterways Experiment Station	Vicksburg, MS	2,705	2,505.940	193.851	63.730	2,763.521	466.960	426.000	
Inst. of Surgical Research	Fort Sam Houston, TX	0	39.000	6.000	17.000	62.000	0.000	12.000	
Matériel Systems Analysis Activity	Aberdeen Proving Gnd, MD	4	1.600	126.350	6.050	134.000	3.596	8.499	
Med. Research Inst. of Chemical Defense	Aberdeen Proving Gr, MD	30	37.419	38.433	123.100	198.952	23.400	28.900	
Med. Research Inst. of Environ. Medicine	Natick, MA	0	47.634	7.060	33.875	88.569	25.505	22.978	
Med. Research Inst. of Infectious Diseases	Fort Detrick, MD	150	121.000	78.000	148.000	347.000	23.962	40.306	
Missile RDEC	Redstone Arsenal, AL	4,000	1,094.000	136.000	137.000	1,367.000	216.000	313.606	
Natick RDEC	Natick, MA	174	415.891	121.763	319.267	856.921	32.217	38.155	
OPTEC-Test and Experimentation Cmd	Fort Hood, TX	22	19.900	41.000	0.000	60.900	6.300	3.000	
Redstone Technical Test Center	Redstone Arsenal, AL	14,000	460.000	52.000	133.000	645.000	146.000	Not Available	
Rsrch Inst. for Behavioral & Social Sciences	Alexandria, VA	0	23.800	85.215	10.900	119.915	4.100	22.700	
Simulation, Training & Instrmntn. Cmd	Orlando, FL	0	0.000	0.000	0.000	0.000	0.000	0.000	
Tank-Automotive RDEC	Warren, MI	105	575.137	217.480	72.557	865.174	108.408	208.600	
Topographic Engineering Center	Alexandria, VA	0	86.776	35.081	53.134	174.991	22.400	17.971	
Walter Reed Army Inst. of Research	Washington, DC	0	403.544	178.372	151.472	733.388	16.460	62.353	
White Sands Missile Range	White Sands Missile, NM	2,162,485	106.542	863.105	4,327.973	5,297.620	421.343	379.000	
Yuma Proving Ground	Yuma, AZ	838,376	22.175	161.300	1,709.159	1,892.634	95.337	283.763	

TABLE 3. NAVY RDT&E ACTIVITIES, PROGRAM AND PERSONNEL DATA, FY 1994													
INSTALLATION	FUNDING DATA (MILLIONS \$)					PERSONNEL DATA							
	TOTAL	TOTALS IN-HOUSE	TOTALS RDT&E	TOTALS IN-HOUSE	TOTALS RDT&E	TOTAL MIL	TOTAL CIV	PHD MIL	PHD CIV	ENG MIL	ENG CIV	ENG MIL	ENG CIV
Naval Aerospace Medical Research Lab	6.240	5.594	6.240	5.594	5.594	39	43	13	7	3	13	3	13
Naval Air Warfare Center	4,543.608	1,961.623	1,475.586	663.640	663.640	3,203	19,185	6	265	319	7005	319	7005
Naval Biodynamics Laboratory	5.170	2.826	5.170	2.826	2.826	19	34	3	3	3	12	3	12
Navy Clothing & Textile Research Facility	4.415	3.228	1.848	1.318	1.318	1	53	0	1	1	32	1	32
Naval Cmd, Control & Ocean Surveillance Ctr.	2,283.47	895.299	455.011	191.862	191.862	189	5,050	3	198	33	2,339	33	2,339
Naval Dental Research Institute	2.139	1.618	1.901	1.380	1.380	27	11	10	4	0	2	0	2
Naval Facilities Engineering Service Ctr.	138.598	89.647	41.471	34.267	34.267	20	531	0	22	13	306	13	306
Naval Health Research Center	9.360	4.770	8.033	4.103	4.103	22	58	10	14	3	28	3	28
Naval Medical Research Institute	63.724	21.907	51.261	13.672	13.672	237	184	60	31	7	36	7	36
Naval Medical Research Unit # 2	4.556	4.463	3.562	3.520	3.520	16	99	12	10	1	40	1	40
Naval Medical Research Unit # 3	6.642	6.404	5.491	5.253	5.253	34	181	9	17	6	5	6	5
Navy Personnel Rsrch & Development Ctr.	29.400	16.109	18.640	9.889	9.889	19	154	8	43	5	66	5	66
Naval Research Laboratory	807.406	370.746	623.638	308.820	308.820	167	3,616	8	884	10	1,010	10	1,010
Naval Submarine Medical Research Lab	4.531	3.594	2.631	2.306	2.306	25	33	6	8	0	4	0	4
Naval Surface Warfare Center	3,011.846	2,006.489	959.312	594.050	594.050	554	19,497	0	393	96	7,445	96	7,445
Naval Undersea Warfare Center	1211.400	645.200	346.900	175.100	175.100	346	6,562	1	143	18	2,896	18	2,896

TABLE 4. NAVY RDT&E ACTIVITIES, FACILITY DATA, FY 1994									
INSTALLATION	LOCATION	ACRES	SPACE AND PROPERTY				COST (MILLIONS \$)		
			SPACE (THOUSANDS OF SQUARE FEET)			TOTAL	REAL		EQUIP
			LAB	ADMIN	OTHER		PROP		
Naval Aerospace Medical Research Lab	Pensacola, FL	3	36.591	26.516	56.714	119.821	2.966		11.000
Naval Air Warfare Center	Arlington, VA	1,145,461	10,133.082	2,054.708	12,377.705	24,565.495	1,701.438		1,443.603
Naval Biodynamics Laboratory	New Orleans, LA	2	25.845	27.907	0.000	53.752	2.263		4.727
Navy Clothing & Textile Research Facility	Natick, MA	0	12.667	16.000	5.630	34.297	0.000		1.441
Naval Cmd, Control & Ocean Surveillance	San Diego, CA	3,709	2,715.800	644.700	1,446.300	4,806.800	229.300		193.400
Naval Dental Research Institute	Great Lakes, IL	0	21.264	6.001	9.318	36.583	5.000		1.876
Naval Facilities Engineering Service Ctr.	Port Hueneme, CA	33	113.800	129.900	74.500	318.200	7.479		7.913
Naval Health Research Center	San Diego, CA	2	32.330	10.650	2.200	45.180	0.000		2.158
Naval Medical Research Institute	Bethesda, MD	7	161.930	63.875	0.000	225.805	8.200		15.316
Naval Medical Research Unit # 2	Jakarta, Indonesia	0	16.900	10.990	4.400	32.290	1.878		1.989
Naval Medical Research Unit # 3	Cairo, Egypt	4	68.244	9.058	71.330	148.632	10.600		5.763
Navy Personnel Rsrch & Development Ctr.	San Diego, CA	3	60.500	21.100	4.500	86.100	1.710		12.210
Naval Research Laboratory	Washington, DC	632	3,292.468	224.564	429.040	3,946.072	215.809		365.987
Naval Submarine Medical Research Lab	Groton, CT	0	46.183	10.537	4.962	61.682	0.000		4.147
Naval Surface Warfare Center	Arlington, VA	72,632	7,512.600	1,713.800	17,371.900	26,598.300	1,295.600		1,693.300
Naval Undersea Warfare Center	Newport, RI	3,239	3,911.500	243.500	2,476.400	6,631.400	245.000		686.700

TABLE 5. AIR FORCE RDT&E ACTIVITIES, PROGRAM AND PERSONNEL DATA, FY 1994												
INSTALLATION	FUNDING DATA (MILLIONS \$)				PERSONNEL DATA							
	TOTAL	TOTALS		IN-HOUSE RDT&E	TOTALS RDT&E	IN-HOUSE RDT&E	TOTAL MIL	TOTAL				ENG CIV
		IN-HOUSE						MIL	CIV	PHD MIL	PHD CIV	
Armstrong Laboratory	188.100	38.500		38.300	166.100	38.300	497	533	75	136	144	135
Arnold Engineering Development Center	304.539	203.018		186.494	251.038	186.494	117	236	1	2	57	61
Development Test Center	333.971	227.508		184.153	263.700	184.153	3,387	2,698	0	4	75	347
Flight Test Center	502.390	329.459		131.448	257.718	131.448	5,245	4,163	53	14	1,136	683
Phillips Laboratory	537.336	127.569		92.055	444.229	92.055	638	1,265	40	224	323	407
Rome Laboratory	374.303	77.712		66.859	284.888	66.859	114	860	9	68	64	469
Wright Laboratory	1,063.50	156.100		141.400	1,029.40	141.400	376	2,090	37	198	269	1,264
46th Test Group	77.419	31.271		25.379	68.027	25.379	191	296	1	2	25	164

TABLE 6. AIR FORCE RDT&E ACTIVITIES, FACILITY DATA, FY 1994										
INSTALLATION	LOCATION	ACRES	SPACE AND PROPERTY					COST (MILLIONS \$)		
			SPACE (THOUSANDS OF SQUARE FEET)					REAL	PROP	EQUIP
			LAB	ADMIN	OTHER	TOTAL	TOTAL			
Armstrong Laboratory	San Antonio, TX	75	727.000	32.000	149.000	908.000	908.000	63.400		71.100
Arnold Engineering Development Center	Arnold Air Station, TN	39,081	1,614.697	370.161	684.564	2,669.422	2,669.422	1,269.562		225.808
Development Test Center	Eglin AFB, FL	463,448	333.722	792.293	11,567.328	12,693.343	12,693.343	638.156		457.990
Flight Test Center	Edwards AFB, CA	297,685	303.366	276.284	8,834.074	9,413.724	9,413.724	711.232		0.299
Phillips Laboratory	Kirtland AFB, NM	5,000	1,935.400	470.300	1,310.700	3,716.400	3,716.400	181.000		1,099.000
Rome Laboratory	Griffiss AFB, NY	1,612	855.546	89.231	44.247	989.024	989.024	46.892		137.400
Wright Laboratory	WPAFB, OH	932	1,435.300	791.614	904.691	3,131.605	3,131.605	816.734		2,069.390
46th Test Group	Holloman AFB, NM	7,052	572.971	55.009	132.641	760.621	760.621	238.792		157.441

TABLE 7. DEFENSE NUCLEAR AGENCY RDT&E ACTIVITIES, PROGRAM AND PERSONNEL DATA, FY 1994												
INSTALLATION	FUNDING DATA (MILLIONS \$)				PERSONNEL DATA							
	TOTALS		TOTALS IN-HOUSE		TOTAL		TOTAL		TOTAL		TOTAL	
	TOTAL	IN-HOUSE	RDT&E	RDT&E	MIL	CIV	MIL	CIV	MIL	CIV	MIL	CIV
Armed Forces Radiobiology Rsrch Inst.	14.913	14.913	13.968	13.968	65	129	17	38	10	21		

TABLE 8. DEFENSE NUCLEAR AGENCY RDT&E ACTIVITIES, FACILITY DATA, FY 1994									
INSTALLATION	LOCATION	SPACE AND PROPERTY					COST (MILLIONS \$)		
		ACRES	SPACE (THOUSANDS OF SQUARE FEET)				TOTAL	REAL PROP	EQUIP
			LAB	ADMIN	OTHER	TOTAL			
Armed Forces Radiobiology Rsrch Inst.	Bethesda, MD	10	61.750	34.257	23.908	119.915	14.156	15.612	

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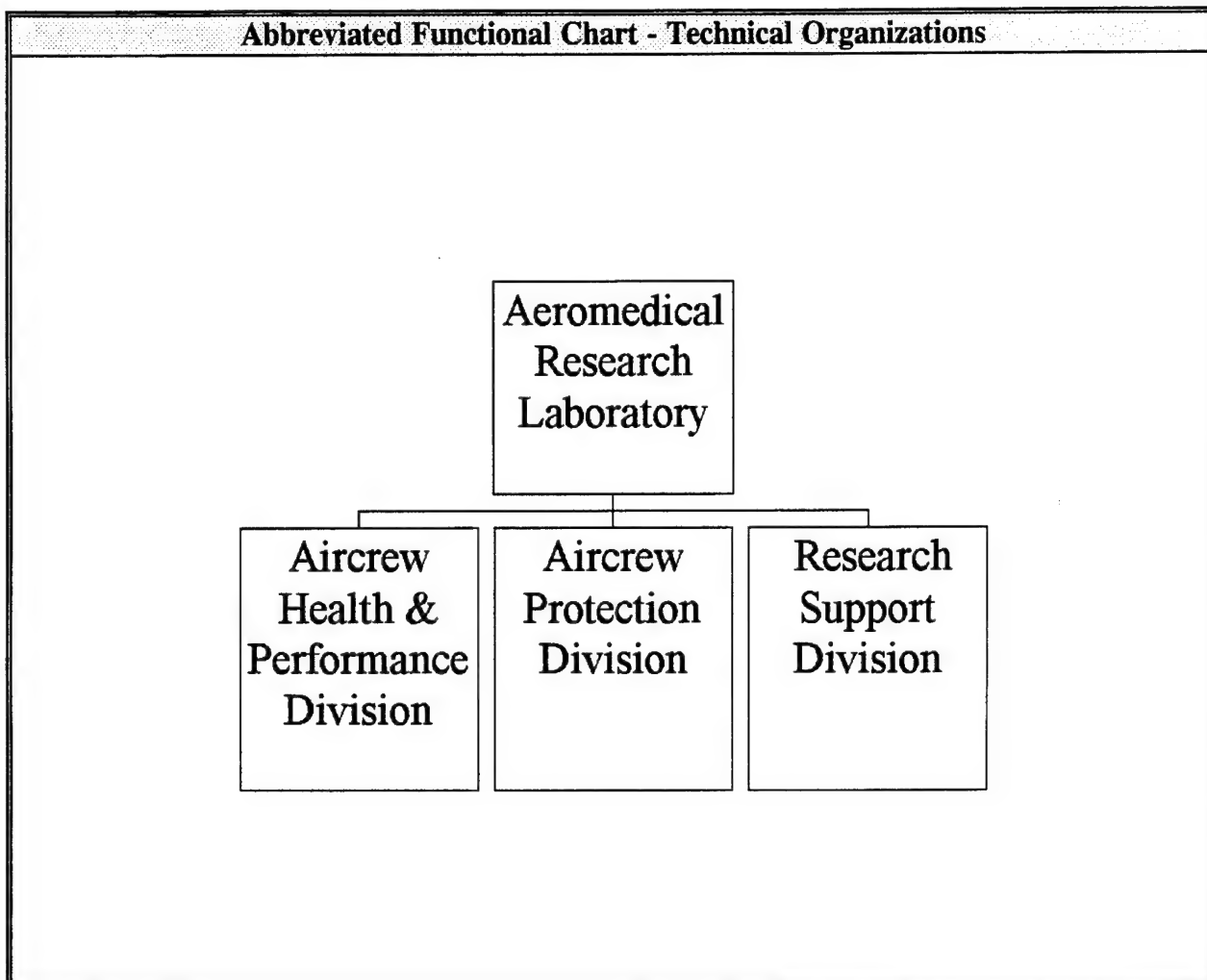
DEPARTMENT OF THE ARMY

## DEPARTMENT OF THE ARMY

The Army's thirty-one (31) In-House RDT&E Activities are:

Aeromedical Research Laboratory .....	2-2
Armament Research, Development and Engineering Center .....	2-6
Army Research Laboratory .....	2-10
Army Space and Strategic Defense Command .....	2-14
Aviation Research, Development and Engineering Center .....	2-22
Aviation Technical Test Center .....	2-26
Cold Regions Research and Engineering Laboratory .....	2-30
Cold Regions Test Center .....	2-36
Combat Systems Test Activity .....	2-40
Communications-Electronics Research, Development and Engineering Center .....	2-44
Construction Engineering Research Laboratories .....	2-50
Dugway Proving Ground .....	2-56
Edgewood Research, Development and Engineering Center .....	2-60
Electronic Proving Ground .....	2-64
Engineer Waterways Experiment Station .....	2-68
Institute of Surgical Research .....	2-74
Materiel Systems Analysis Activity .....	2-78
Medical Research Institute of Chemical Defense .....	2-82
Medical Research Institute of Environmental Medicine .....	2-90
Medical Research Institute of Infectious Diseases .....	2-94
Missile Research, Development and Engineering Center .....	2-98
Natick Research, Development and Engineering Center .....	2-104
OPTEC Test and Experimentation Command .....	2-108
Redstone Technical Test Center .....	2-112
Research Institute for Behavioral and Social Sciences .....	2-116
Simulation, Training and Instrumentation Command .....	2-120
Tank Automotive Research, Development and Engineering Center .....	2-124
Topographic Engineering Center .....	2-128
Walter Reed Army Institute of Research .....	2-132
White Sands Missile Range .....	2-138
Yuma Proving Ground .....	2-142

**Aeromedical Research Laboratory**



**Aeromedical Research Laboratory**  
Fort Rucker, AL 36362-0577  
(205) 255-6920

Commander: COL Dennis F. Shanahan  
Deputy CDR: LTC Clarence R. Collins

### MISSION

Conducts medical research related to the effects of military aviation, combat vehicles, and other weapons systems on soldier health and performance. Conducts research on the impact of continuous operations on crew performance, on health hazards of emerging military materiel systems and develops design criteria for aviator protective equipment and visual systems.

### CURRENT IMPORTANT PROGRAMS

Aviator Performance Effects of Sustained Operations, Sleep Cycle Disruption and Extended Use of Night Vision Devices.

Soldier Tolerance to Biomechanical Impact and Prevention of Impact Injury.

Aeromedical (MANPRINT) Support for Comanche (RAH-66) and New Training Helicopter (NTH) Development.

Blast Overpressure (Impulse Noise) Tolerance.

Contact Lenses in Military Environments.

**EQUIPMENT/FACILITIES**

Multi-Axis Ride Simulation System; Helmet Drop Test Tower and Impact Facility; Variable Center of Gravity Helmet Device; Cardiopulmonary Lab; Biochemistry Lab; UH-60 Aeromedical Research Flight Simulator; Helicopter inflight Monitoring System; Modified Aircraft for Inflight Medical Research; Data Acquisition and Biotelemetry System - In-House/Mobile; Vivarium; High Intensity Impulse Noise generator (Shock Tube); Blast Overpressure Test Site (Explosive and Shock Tube Exposure); Mobile Acoustics Lab; Anechoic and Reverberation Chambers; Bio-Optical Testing Lab; Optical Fabrication Lab; Electro-Optical Testing Lab; Mobile Visual Displays Lab; Scientific and Medical Research Information Center; MEDEVAC Equipment Testing Facility; and Aviation Epidemiology Data Register.

BUILDING	AGE
6901	13 YRS
6902	13 YRS
6904	9 YRS
6903	19 YRS
6905	7 YRS
6906	4 YRS
8825	24 YRS

**Aeromedical Research Laboratory**  
 Fort Rucker, AL 36362-0577  
 (205) 255-6920

Commander: COL Dennis F. Shanahan  
 Deputy CDR: LTC Clarence R. Collins

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.062	NA	0.062
6.1 Other	0.917	0.038	0.955
6.2 IED (Navy)	NA	NA	NA
6.2 Other	4.258	0.084	4.342
6.3	0.037	0.000	0.037
<b>Subtotal (S&amp;T)</b>	<b>5.274</b>	<b>0.122</b>	<b>5.396</b>
6.4	0.410	0.000	0.410
6.5	0.002	0.000	0.002
6.6	0.000	0.000	0.000
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>5.686</b>	<b>0.122</b>	<b>5.808</b>
Procurement	0.057	0.000	0.057
Operations & Maintenance	0.031	0.000	0.031
Other	3.501	0.000	3.501
<b>TOTAL FUNDING</b>	<b>9.275</b>	<b>0.122</b>	<b>9.397</b>

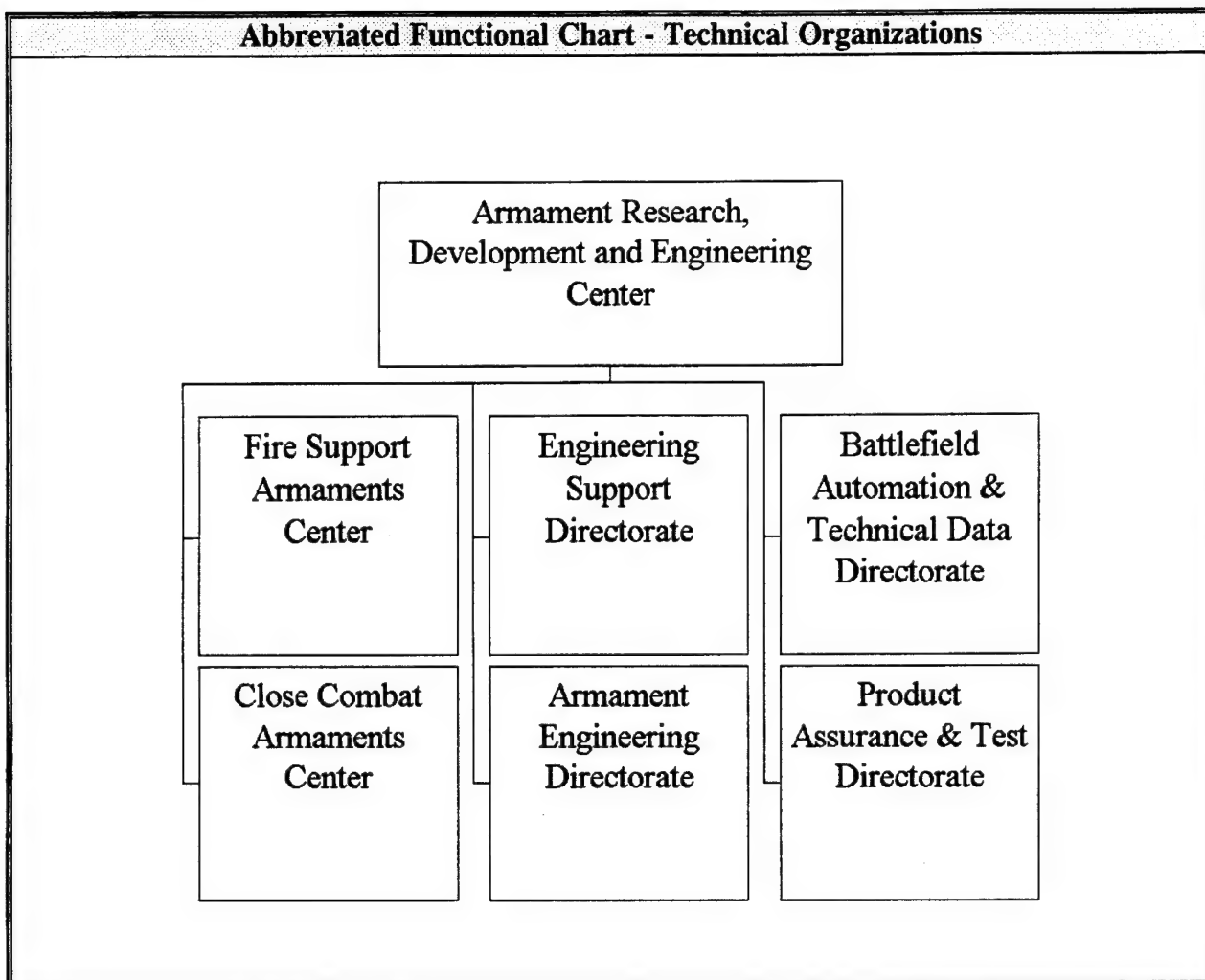
MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	71	11	3	57
CIVILIAN	44	10	6	28
<b>TOTAL</b>	<b>115</b>	<b>21</b>	<b>9</b>	<b>85</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	107.946	<b>REAL PROPERTY</b>	12.357
ADMIN	25.520	* NEW CAPITAL EQUIPMENT	0.733
OTHER	19.548	<b>EQUIPMENT</b>	44.840
<b>TOTAL</b>	<b>153.014</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.526
<b>ACRES</b>	<b>44</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

Armament Research, Development and Engineering Center



**Armament Research, Development and Engineering Center**

Picatinny Arsenal, NJ 07806-5000  
(201) 724-6000

Commander: BG James W. Boddie, Jr.  
Technical Dir: Mr. Carmen J. Spinelli

**MISSION**

Conduct or manage research, development, acquisition and life-cycle engineering, including product assurance, engineering in support of items in production and integrated logistics support for assigned armament, munitions systems, and fire control materiel. Provide procurement and management of initial production quantities and technical support to our ultimate customer - the soldier in the field. Maintain a technology base to facilitate the transition of technologies, via technology insertions for fielded systems and /or new systems developments, that account for 90% of the Army's conventional lethality.

**CURRENT IMPORTANT PROGRAMS**

Smart Munitions (including Intelligent Mines and Low Cost "Component" Munitions)  
Pollution Prevention for Army Materiel Life Cycle Processes  
Tank Gun, Combat Vehicle Cannon, Cannon Artillery and Mortar Systems, and Munitions  
Advanced Gun Propulsion (including Liquid Propellants and Electric Launch)  
Individual Soldier and Crew Served Weapons  
Ammunition Logistics System Enhancement

**EQUIPMENT/FACILITIES**

Capability to formulate, process, manufacture and test energetic materials in small scale production quantities for evaluation in end item configurations. Labs for the synthesis, characterization and analysis of explosives, propellants, and pyrotechnics. Six-degree-of-freedom simulator produces forces and stresses on material in an instrumented lab environment, while a 155mm air gun simulates spin and acceleration forces munitions items experience in firing allowing recovery and analysis of parts and components. The Electric Armaments Research Center features the world's highest energy capacitor-based electric gun laboratory power supply using a 52 megajoule capacitor storage to drive electric guns at energy levels exceeding those of current tank main armaments. Our Armaments Technology Facility (on line by mid FY95) will be the Army's premier small and cannon caliber facility for system design, validation and test of air defense, aircraft, and combat vehicle armaments. The Distributed Interactive Simulation Node supports a full spectrum of high capacity simulation network activities for war fighting simulation. Currently simulating indirect fire weapons, such as the Paladin Self-Propelled Howitzer, growth is expected to include all mission commodities.

## Armament Research, Development and Engineering Center

Picatinny Arsenal, NJ 07806-5000  
(201) 724-6000

Commander: BG James W. Boddie, Jr.  
Technical Dir: Mr. Carmen J. Spinelli

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	1.048	NA	1.048
6.1 Other	3.388	9.061	12.449
6.2 IED (Navy)	NA	NA	NA
6.2 Other	30.713	27.443	58.156
6.3	8.585	35.068	43.653
<b>Subtotal (S&amp;T)</b>	<b>43.734</b>	<b>71.572</b>	<b>115.306</b>
6.4	39.296	8.461	47.757
6.5	27.665	21.737	49.402
6.6	38.914	37.136	76.050
6.7	0.526	20.251	20.777
Non-DOD	0.336	0.000	0.336
<b>TOTAL RDT&amp;E</b>	<b>150.471</b>	<b>159.157</b>	<b>309.628</b>
Procurement	88.956	133.796	222.752
Operations & Maintenance	43.831	6.256	50.087
Other	8.570	18.136	26.706
<b>TOTAL FUNDING</b>	<b>291.828</b>	<b>317.345</b>	<b>609.173</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	19.200

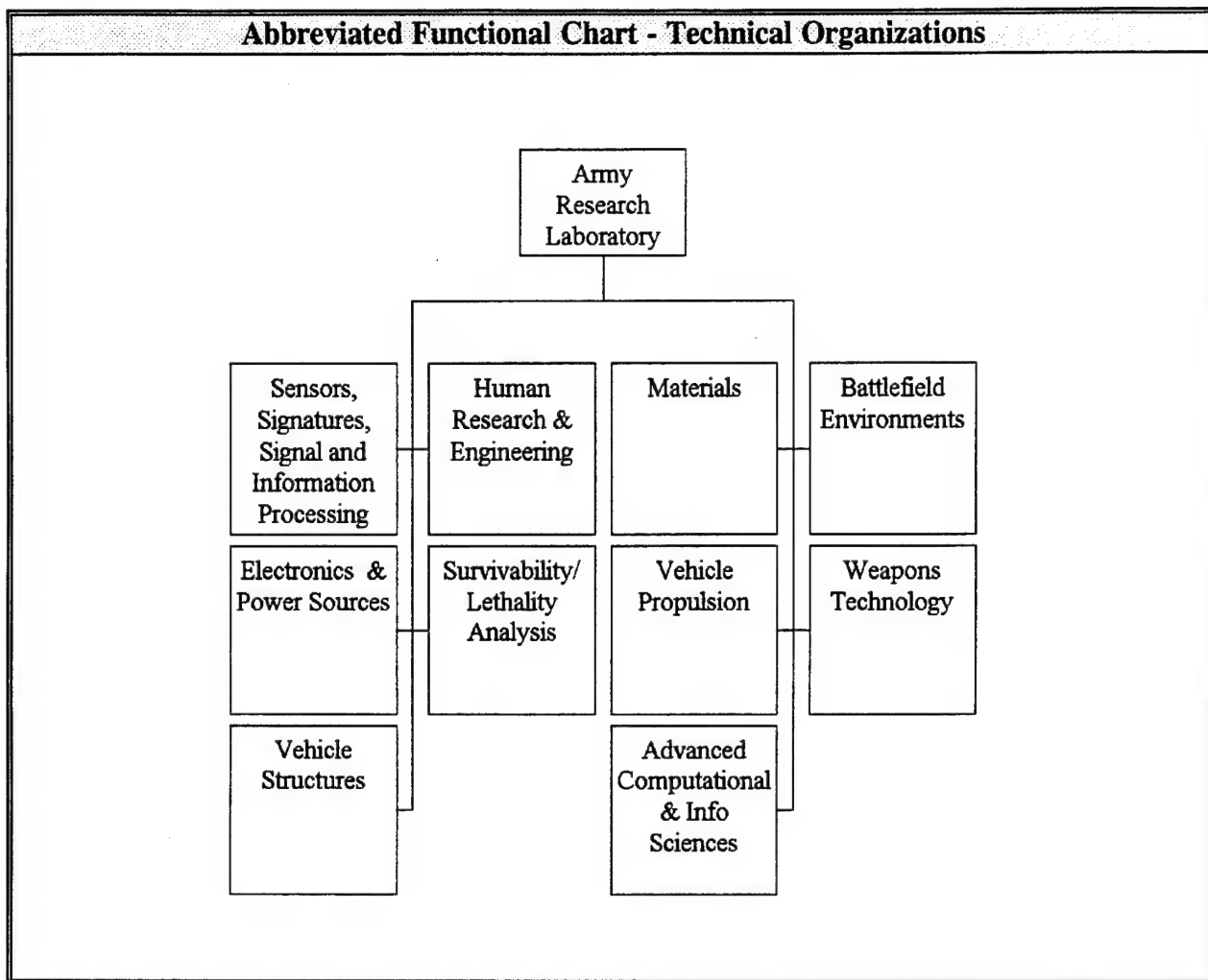
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	59	1	14	44
CIVILIAN	4,194	71	1,786	2,337
<b>TOTAL</b>	<b>4,253</b>	<b>72</b>	<b>1,800</b>	<b>2,381</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	452.617	<b>REAL PROPERTY</b>	176.524
ADMIN	1,154.144	* NEW CAPITAL EQUIPMENT	2.500
OTHER	2,424.937	<b>EQUIPMENT</b>	208.142
<b>TOTAL</b>	<b>4,031.698</b>	* NEW SCIENTIFIC & ENG. EQUIP.	2.374
<b>ACRES</b>	<b>5,884</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Army Research Laboratory



**Army Research Laboratory**  
Adelphi, MD 20783-1197  
(301) 394-1600

Director: Dr. John W. Lyons  
Dep. Director: COL Thomas Dunn

### MISSION

The mission of ARL is to execute fundamental and applied research to provide the Army the key technologies and analytical support necessary to assure supremacy in future land warfare.

We envision the future ARL to be: A laboratory preeminent in key areas of science and engineering relevant to land warfare; A staff widely recognized as outstanding; A partner with the Defense community, close to Army users and seen by them as essential to their missions; An intellectual crossroads for the technical community, intensively interacting with academe, industry, and other government laboratories in the U.S. and abroad.

### CURRENT IMPORTANT PROGRAMS

Digitization and Communication Science  
Armor & Armaments  
Soldier as a System  
Survivability/Lethality Analysis  
Air and Ground Vehicle Technology

### EQUIPMENT/FACILITIES

Acoustic Source Generation System, Test Range for Advanced Aerospace Vulnerability, Ultralithography Facility, Advanced Microanalysis Center, Frequency Control and Acoustic Signal Processing Facility, Display Technology Center, Ion Implantation Facility, Aerodynamics Range, Transonic Range, Blast Range, Large-Caliber Experimental Test Facility, Autoclaves for Composites Processing Research, Materials Characterization Facility, "Big Crow" Electronic Warfare Flying Laboratory, High-Power-Microwave Research Facility, HIFX Flash X-Ray Facility, Triaxis Vibrator, Flame Research Facility, Atmospheric Profiling Research Facility, Aerosol/Laser Energy Interaction Laboratory, Computerized 600-m Small Arms Range, Indoor/Outdoor Robotics and Automation Research and Test Facility, Computerized Mobility/Portability Course, Pulse Power Center, Aurora Pulsed Radiation Facility, Icing Research Tunnel, Crashworthiness Facility, Transonic Dynamics Tunnel, High-Performance Computing Resources, Ultra-Wideband Foliage-Penetrating Synthetic Aperture Radar Test Bed, Nanoelectronic Fabrication Facility, Compression/Shear Gas Gun with 4-Beam Visar.

Army Research Laboratory  
 Adelphi, MD 20783-1197  
 (301) 394-1600

Director: Dr. John W. Lyons  
 Dep. Director: COL Thomas Dunn

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	26.598	13.348	39.946
6.2 IED (Navy)	NA	NA	NA
6.2 Other	147.403	80.099	227.502
6.3	0.000	1.930	1.930
<b>Subtotal (S&amp;T)</b>	<b>174.001</b>	<b>95.377</b>	<b>269.378</b>
6.4	2.157	0.101	2.258
6.5	0.000	0.000	0.000
6.6	71.262	58.838	130.100
6.7	0.847	3.015	3.862
Non-DOD	1.124	1.628	2.752
<b>TOTAL RDT&amp;E</b>	<b>249.391</b>	<b>158.959</b>	<b>408.350</b>
Procurement	0.029	0.271	0.300
Operations & Maintenance	0.008	0.057	0.065
Other	3.267	55.436	58.703
<b>TOTAL FUNDING</b>	<b>252.695</b>	<b>214.723</b>	<b>467.418</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

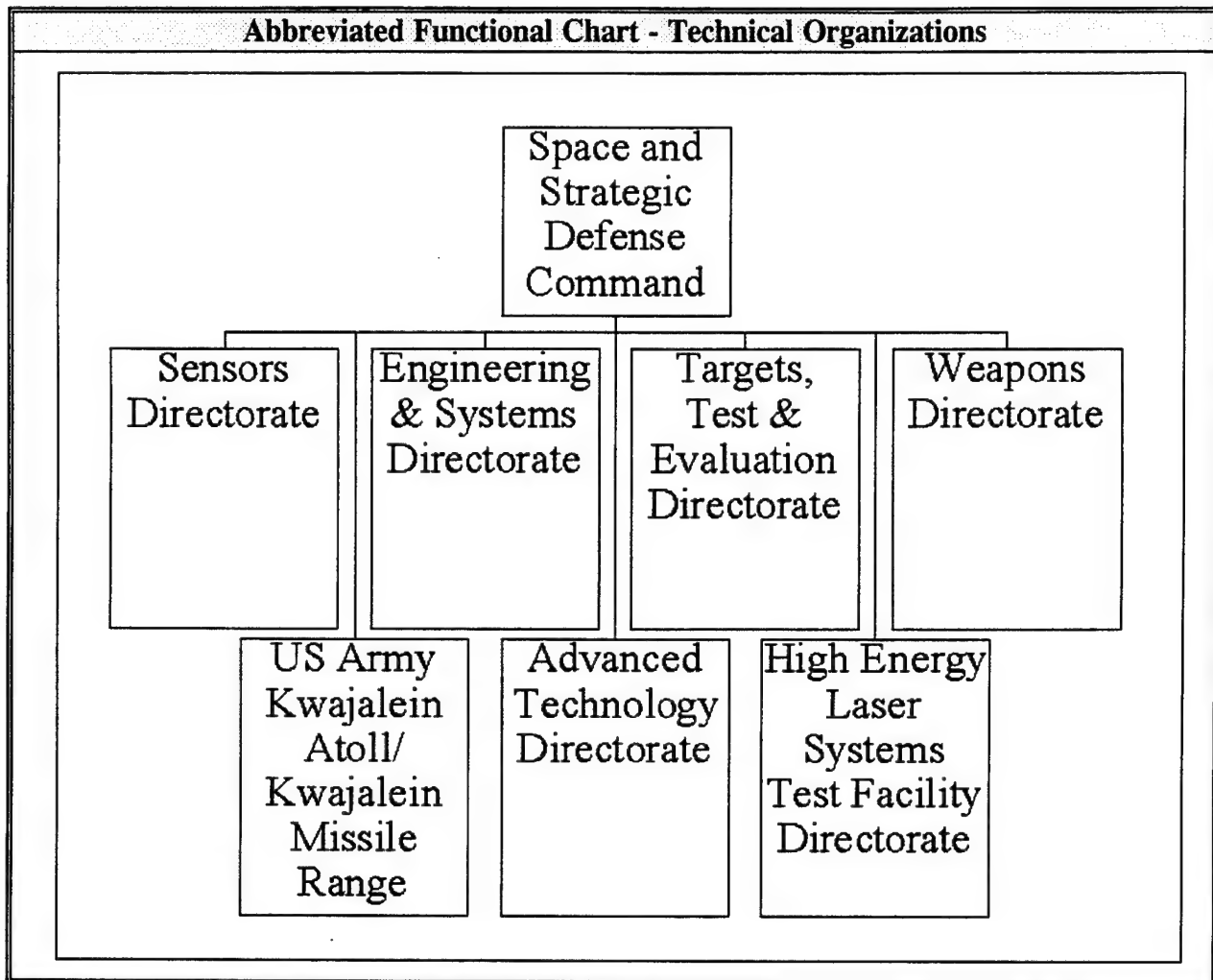
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	111	9	32	70
CIVILIAN	3,349	382	1,378	1,589
<b>TOTAL</b>	<b>3,460</b>	<b>391</b>	<b>1,410</b>	<b>1,659</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	1,852.700	<b>REAL PROPERTY</b>	1,325.430
ADMIN	426.700	* NEW CAPITAL EQUIPMENT	5.574
OTHER	732.100	<b>EQUIPMENT</b>	552.612
<b>TOTAL</b>	<b>3,011.500</b>	* NEW SCIENTIFIC & ENG. EQUIP.	N/A
<b>ACRES</b>	<b>2,353</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Army Space and Strategic Defense Command



**Army Space and Strategic Defense Command**  
Arlington, VA 22215-0280  
(703) 607-1874

Commander: LTG Jay M. Garner  
Chief Scientist: Dr. Darrell Collier

### MISSION

- Function as the designated Army focal point and advocate for Space and Strategic Defense.
- Conduct research, development, and application of technologies related to space, strategic and theater missile defense.
  - Interface with combat development organizations and activities for space applications, Strategic and Theater Missile Defense.
  - Execute assigned test and evaluation programs.
  - Operate a national laser RDT&E facility at HELSTF.
  - Manage the Consolidated Targets Program
- Through US Army Space Command serve as the Army Component of the US Space Command.
  - Operate assigned space and missile defense systems.
  - Execute Army Space Exploitation and Demonstration Program (ASEDP)
  - Expedite relevant space products to Army components of Unified Command and Army forces worldwide.
  - Provide USCINCSpace Army perspectives and requirements for joint space systems support of Army operations.
- Command US Army Kwajalein Atoll (USAKA)/ Kwajalein Missile Range (KMR) and its associated national missile range facilities.
- Provide matrix support for PEO Missile Defense.

**CURRENT IMPORTANT PROGRAMS****THEATER MISSILE DEFENSE:**

Theater High Altitude Air Defense (THAAD) - THAAD will demonstrate the integration of Ballistic Missile Defense and other advanced technologies to extend the anti-tactical ballistic missile capabilities of air defense forces in various theaters of operation. The THAAD weapon system will consist of multiple subsystems elements, to included the Government Furnished Equipment surveillance/track X-band radar, and contractor-developed-hit-to-kill THAAD interceptor, launcher, battle management/command control, communications and intelligence (BM/C3I) units.

Theater Missile Defense-Ground Based Radar (TMD/GBR) - An X band, phased array radar which will perform search, for control, and kill assessment functions for the theater missile defense system. Will provide full engagement support to the THAAD system, including missile interceptor uplinks and downlinks, surveillance, tracking, target classification and kill assessments.

Patriot Advanced Capability 3 (PAC-3) - Advanced high to medium altitude surface to air missile system that serves as the Army's centerpiece of theater air defense. Consists of preplanned product improvements of both hardware and software to maintain system viability against an increasingly sophisticated threat from Theater Ballistic Missiles.

Extended Range Interceptor (ERINT) - Demonstrate the capability of a hypervelocity missile that will provide hit-to-kill accuracy against tactical ballistic or maneuvering missiles and air-breathing threats. The ERINT missile provides realistic mission profiles against potential targets in the ballistic and maneuvering tactical missile classes. The ERINT was selected as the PAC-3 interceptor.

Joint Tactical Ground Station (JTAGS) - A PEO-MD TMD managed program and a cooperative effort with the Navy, provides timely and tailored reporting on tactical ballistic missile launches. Transitioning from an advanced technology demonstration to a formal acquisition program.

Corps Surface to Air Missile (SAM) - Envisioned as a high firepower, mobile, modular, medium range air defense capable of operating in a heavy electronic counter measure and anti-radiation missile environments. It will replace both Hawk and Chaparral. Will provide overlapping coverage for forward area air defense and high-medium air defense systems.

ARROW - Tasked to conduct an experimental flight and missile intercept program to demonstrate the Israeli developed ARROW missile system. Data from the program was directed into U.S. databases to support U.S. interceptor development. ARROW continuation experiments program is a follow-on effort. Will provide data on high velocity separation, high velocity guided flight, high altitude aerodynamic maneuvering, electro-optical seeker at high velocity, efficiency of the focal plane array integration into missile flight control, and utility of electro-optical seekers at low altitudes.

Theater Targets Products Office- Manage, direct, develop, and acquire theater target systems for application to the command and BMDO functions. Manage the Storm and Hera Target developments, which provide reliable realistic baseline target sets for intercept by ERINT, PATRIOT, CORPS SAM, Terrier LEAP, Navy Lower Tier, and THAAD.

**Army Space and Strategic Defense Command****CURRENT IMPORTANT PROGRAMS**

Advanced Concepts for TMD also include; Air Defense/TMD Operations Center, Optical Surveillance System, Directed Energy Weapon, Advanced Discrimination Interceptor, Laser Radar.

**NATIONAL MISSILE DEFENSE:**

Exoatmospheric Kill Vehicle - Developing, demonstrating, and validating technology, components and operational concepts for a semi-autonomous, low cost, lightweight, non-nuclear hit to kill missile to intercept enemy ICBM's.

Ground Based Radar - Test (GBR-T) - X band radar for the NMD-GBR and will be deployed at Kwajalein in 1995.

Command Center Element (C2E) - Structure and implement a demonstration/validation program which demonstrates technical feasibility of the allocated functional and performance baseline for the Army Component Command Center, Regional Operational Centers, Terrestrial Communications Network and fixed ground entry point.

Strategic Targets Product Office - Manage, direct, develop, and acquire strategic target systems for application to command and BMDO missions. Manage the Strategic Target Systems (STARS) Program which provides a realistic, reliable target launch vehicle for data gathering, system development and testing for NMD, the Midcourse Space Experiment, and possible TMD applications.

Advanced Concepts for NMD include: Laser Radar, Radio Frequency Weapon, NMD Ground Based Radar, Advanced Discrimination Interceptor.

**SPACE:**

Space Applications Technology Program (SATP) - The program supports development of Army space-related system requirements, defines and develops Army requirements for joint space systems, and integrates commercial dual-use space applications. Space Applications Technology will ultimately provide the warfighters overmatching capabilities to dominate all dimensions of the battlefield through Space to guarantee decisive victory in the XXI century.

**BROAD BASED PROGRAMS:**

Missile Defense Battle Integration Center (MDBIC) - Established to provide four pillar integration of Theater Missile Defense (TMD) and to evaluate and integrate technologies applicable to National Missile Defense (NMD) and Army space programs. Issues are addressed through a combination of constructive, virtual, and live simulations, models, analyses, and field exercises. The center provides for the integration of TMD into education, training, modeling, simulation, and wargaming development exercises.

**CURRENT IMPORTANT PROGRAMS**

Extended Air Defense Test bed (EADTB) - Objectives of the EADTB Program are 1) Develop a capability to simulate air defense scenarios for TMD analysis. 2) Provide a common, improved analysis tool supporting material developers, combat developers and operational commanders. 3) Advance state-of-the-art in simulations. The EADTB will support analysis of the TMD operational elements, and will provide the flexible common hardware and software to conduct Extended Air Defense analysis. Results of these analysis will enable EADTB users to provide decision makers with the basis for evaluating the performance of weapon systems and optimizing the use of scarce R&D resources. User selectable fidelity and user configurable rulesets are two key features which distinguish EADTB from other simulations.

Surveillance Test Bed (STB) - STB is being developed at the Advanced Research Center to conduct demonstration/validation experiments to address MD/TMD surveillance issues, concerns, potential risks and requirements definition. The surveillance functions include detection, acquisition, track, association/correlation, bulk filtering, discrimination, data fusion and sensor tasking.

Technology Development - The general objective of the technology programs is to develop and maintain a technology base and a research capability which support functional performance requirements of theater defense and strategic missile defense systems for BMDO and PEO MD. Multiple technology programs are being developed to support the strategic defense technology base, which will be coordinated and integrated as needed with other Army technology base programs. SSDC is working over one hundred of these programs which fall under 14 of the 20 Science and Technology Areas.

**EQUIPMENT/FACILITIES**

**High Energy Laser Systems Test Facility (HELSTF):** One of a kind facility ideally suited to explore concepts of directed energy weapons employment without the need to develop all new laser systems. The only instrumented laser range in the free world capable of engaging flying targets with high energy lasers. Contains three major areas for testing targets of any size or configuration to include full size missiles or weapon systems and explosive materials. Includes capability to replicate a 300,000 ft altitude with target sizes up to one half of a shuttle payload. Full power laser tests as well as space environmental tests without a laser can be performed at this simulated altitude.

**U.S. Army Kwajalein Atoll (USAKA):** Home of the Kwajalein Missile Range (KMR), a strategic asset of the DoD Major Range and Test Facility Base. The combination of the world's most sophisticated suite of instrumentation and an isolated mid-Pacific location provided KMR unsurpassed capabilities to support full-envelope testing of offensive and defensive ballistic missiles, as well as space operations and experiments. Current emphasis supports the testing of theater missile defense systems.

KMR instrumentation consists of integrated radar, optical, telemetry, communication and flight safety systems distributed across eight islands within the atoll. Multiple launch sites at Kwajalein, a nearby atoll, and Wake Island provide extensive geometries for missile testing. KMR possesses our nation's only operational strategic ABM launch site and ICBM land impact area. The hallmark of KMR instrumentation is the Kiernan Reentry Measurement Site (KREMS), a suite of four unique radars, collecting simultaneous signature and metric data at seven frequencies (VHF, UHF, L, S, C, 35 GHz, and 95 GHz). Real-time data collection and post mission analysis provide critical information such as lethality assessment, vehicle body microdynamics, and precision trajectory reconstruction for ballistic missile defense applications. With its equatorial location, KMR's VHF/UHF radar has the sensitivity (tracking a .1M target at a range of 40,000 Km) to provide U.S. Space Command critical 24 hour a day surveillance of both near-earth and deep-space satellites, and new foreign launch coverage. KMR's S-band radar has unequalled capabilities for detection and characterization of orbital debris (particle sizes less than 1.5 cm) in support of DoD and NASA space operations. The dual frequency (35/95 GHz) Millimeter Wave radar has a 1 GHz bandwidth (with planned improvements to 2 GHz), provides unsurpassed imagery resolution for space object identification, and supports the future development of Ballistic Missile Defense interceptor and radar systems.

**Army Space and Strategic Defense Command****EQUIPMENT/FACILITIES**

**Airborne Surveillance Test bed (AST):** A modified Boeing 767 aircraft with a mounted, large-field-of-view, long wavelength infrared (LWIR) sensor designed to collect infrared data on a wide variety of ballistic missile targets.

**COBRA JUDY:** Ship board sensors, designed to collect high quality signature data on missile systems. The data is used in support of threat characterization, defensive radar design, and discrimination algorithm development and validation. Contains S Band which will spatially characterize an entire complex and X Band single target tracker capable of collecting high resolution signature data on several targets, serially during a mission.

**High Altitude Observatory (HALO):** An instrumented Gulfstream II-B optical data collection aircraft providing airborne collection of multispectral (spanning the ultraviolet through the longwave infrared), imaging (Calibrated radiometric and photo documentary), optical signature data on targets of interest including reentry vehicles, missile plume phenomenology, missile/target intercepts, and intercept debris characterization and kill assessment.

**Kinetic Energy Weapon Digital Emulation Center (KDEC):** An analysis center supporting the evaluation of Kinetic Energy Weapon (KEW) technologies and interceptor performance.

**Advanced Research Center (ARC):** Provides a highly flexible, cost effective research and computational test bed to support advanced technology simulations and experiments in support of Missile Defense. Processor architectures supported consist of high speed vector and scalar uniprocessors, tightly coupled parallel processors, and graphic workstations with capability to compute 5,800 million instructions per second. Research includes Virtual Reality and Parallel Programming schemes.

**Missile Defense Data Center (MDDC):** Provides Ballistic Missile Defense Office (BMDO) approved scientific and academic community with access to information collected by BMDO measurement programs, to provide multi-mission, multi-sensor data fusion capability, and to provide storage and dissemination of past, present, and future data relevant to the missile defense activities of the U.S. and allied nations.

**Optical Discrimination Algorithms (ODA) Development Center:** Multi-Contractor facility housing a wide array of networked Silicon Graphic computer hardware to develop discrimination algorithms that can discern between lethal and non-lethal objects in a real defense scenario.

**Simulation Center (SC):** A contractor operated facility which provides scientific and engineering supercomputer support. Includes Cray Y-MP series machines, VAX, Silicon Graphics, Sun and Solbourne. Available 24 hours a day, 7 days a week.

Army Space and Strategic Defense Command  
Arlington, VA 22215-0280  
(703) 607-1874

Commander: LTG Jay M. Garner  
Chief Scientist: Dr. Darrell Collier

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.000	0.000	0.000
6.3	23.575	420.188	443.763
<b>Subtotal (S&amp;T)</b>	<b>23.575</b>	<b>420.188</b>	<b>443.763</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	8.146	189.887	198.033
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>31.721</b>	<b>610.075</b>	<b>641.796</b>
Procurement	0.000	0.180	0.180
Operations & Maintenance	0.390	4.613	5.003
Other	0.000	0.000	0.000
<b>TOTAL FUNDING</b>	<b>32.111</b>	<b>614.868</b>	<b>646.979</b>

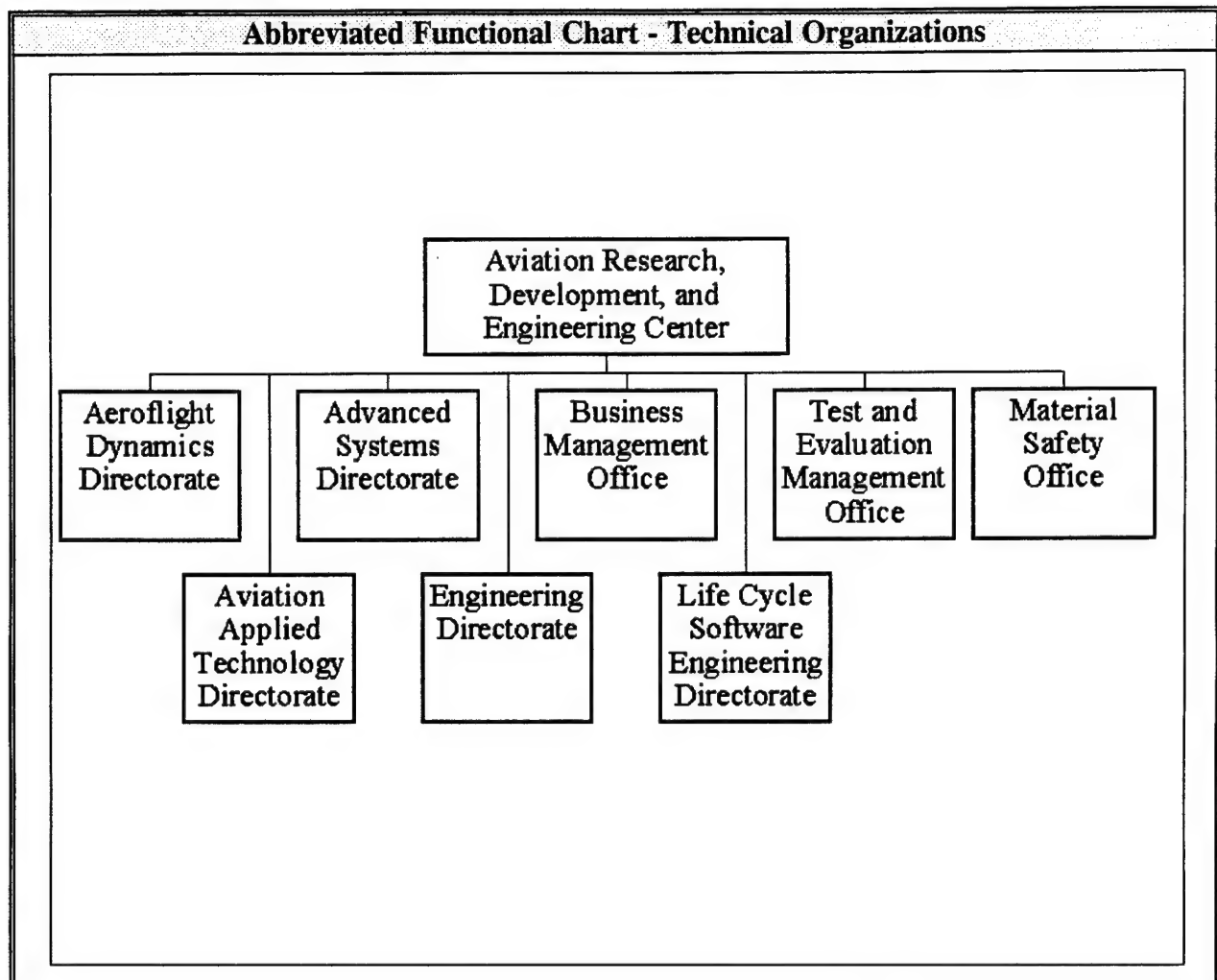
MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	25.025

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	107	1	0	106
CIVILIAN	1,002	37	504	461
<b>TOTAL</b>	<b>1,109</b>	<b>38</b>	<b>504</b>	<b>567</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	0.000	<b>REAL PROPERTY</b>	848.278
ADMIN	392.761	* NEW CAPITAL EQUIPMENT	1.028
OTHER	413.123	<b>EQUIPMENT</b>	330.000
<b>TOTAL</b>	<b>805.884</b>	* NEW SCIENTIFIC & ENG. EQUIP.	5.113
ACRES	3,885	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## Aviation Research, Development and Engineering Center



**Aviation Research, Development and Engineering Center**

St. Louis, MO 63120-1798

(314) 263-1012

Commander: MG John S. Cowings

Technical Dir: Thomas L. House

**MISSION**

Execute the DoD Rotorcraft Science and Technology program and provide "one-stop" engineering support to all life cycle phases as required to achieve technologically superior, safe, and supportable Army aviation systems and equipment. The AVRDEC has the responsibility to plan and, in most cases, execute the fundamental basic research, exploratory development, and advanced development programs supporting DoD rotorcraft needs in the areas of aeromechanics, propulsion, structures, reliability and maintainability, survivability, weaponization, avionics mission equipment, and systems integration/simulation.

**CURRENT IMPORTANT PROGRAMS**

Rotorcraft Pilot's Associate; Joint Turbine Advanced Gas Generator and Integrated High Performance Turbine Engine Technology; Man/Machine Integration Design and Analysis System; Advanced Boresight Equipment; Improved Airframe Manufacturing Technology; Turbine Engine Diagnostic System; Unit Maintenance Aerial Recovery Kit; Advanced Aerial Cargo Handling System; Aircraft Component Improvement Program.

**EQUIPMENT/FACILITIES**

Infra-Red Suppressor Facility, Ballistic Test Range, Crew Station Research and Development Facility, Flight Research Aircraft, NASA-Ames 40x80x120 Wind Tunnel, NASA - Ames Vertical Motion Simulator, NASA-Ames Automation Sciences Research Facility, NASA-Ames Numerical Aerodynamic Simulator, NASA-Ames Fluid Mechanics Laboratory, NASA-Ames Hover Anechoic Chamber, NASA-Ames Helicopter Human Factors Research Facility, NASA - Ames 7x10 Wind Tunnel, NASA - Langley 14x22 Wind Tunnel.

## Aviation Research, Development and Engineering Center

St. Louis, MO 63120-1798

(314) 263-1012

Commander: MG John S. Cowings

Technical Dir: Thomas L. House

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.572	NA	0.572
6.1 Other	1.547	1.338	2.885
6.2 IED (Navy)	NA	NA	NA
6.2 Other	20.272	12.294	32.566
6.3	2.948	24.108	27.056
<b>Subtotal (S&amp;T)</b>	<b>25.339</b>	<b>37.740</b>	<b>63.079</b>
6.4	1.321	4.394	5.715
6.5	0.000	0.000	0.000
6.6	7.638	8.778	16.416
6.7	0.100	12.628	12.728
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>34.398</b>	<b>63.540</b>	<b>97.938</b>
Procurement	0.000	5.499	5.499
Operations & Maintenance	12.396	8.242	20.638
Other	6.395	3.576	9.971
<b>TOTAL FUNDING</b>	<b>53.189</b>	<b>80.857</b>	<b>134.046</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

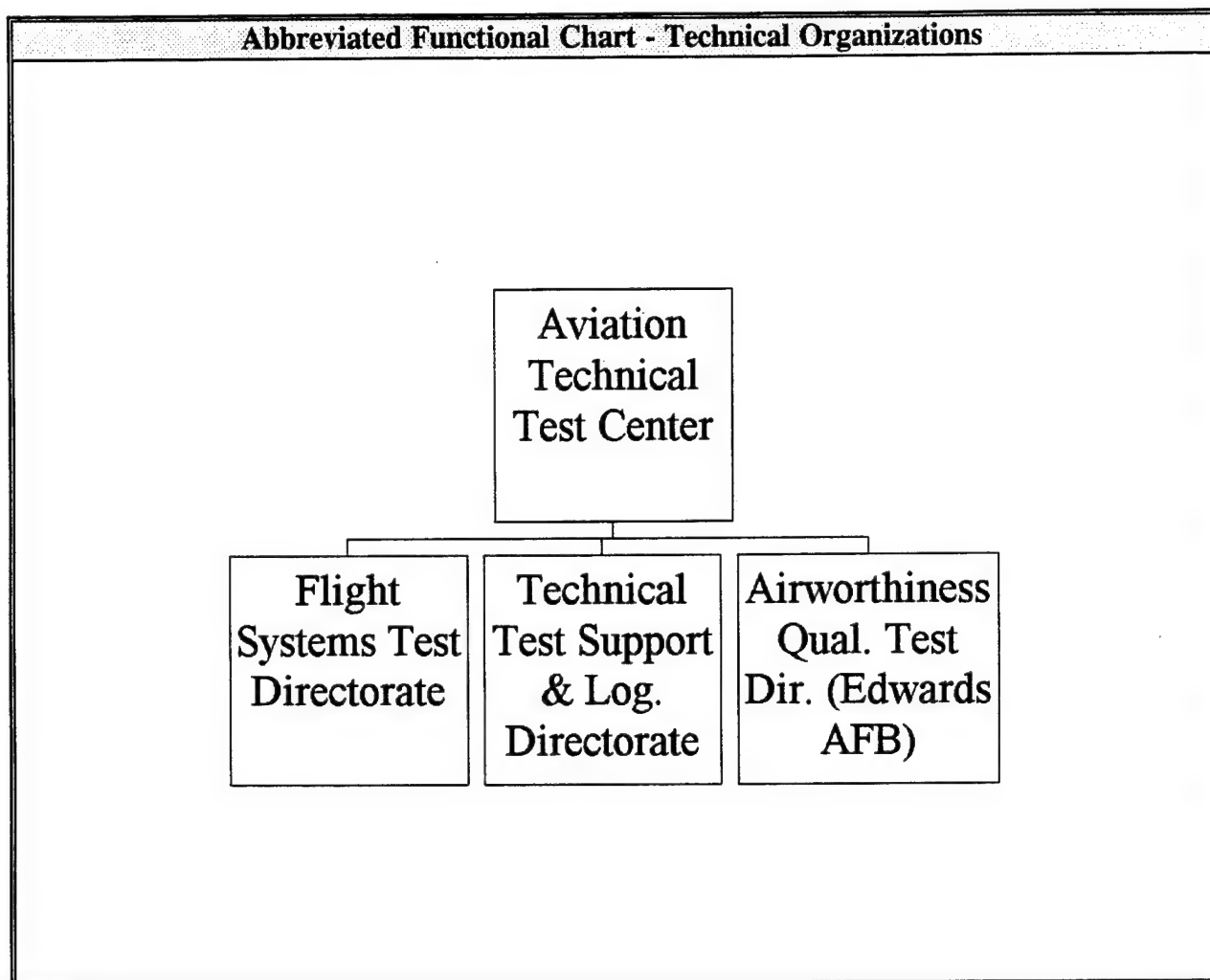
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	15	2	9	4
CIVILIAN	775	28	450	297
<b>TOTAL</b>	<b>790</b>	<b>30</b>	<b>459</b>	<b>301</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	108.852	<b>REAL PROPERTY</b>	6.602
ADMIN	64.741	* NEW CAPITAL EQUIPMENT	1.738
OTHER	14.730	<b>EQUIPMENT</b>	26.359
<b>TOTAL</b>	<b>188.323</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.248
<b>ACRES</b>	<b>0</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## Aviation Technical Test Center



**Aviation Technical Test Center**

Fort Rucker, AL 36362-5276

(205) 255-8000

Commander: COL Joseph L. Bergantz

Tech Dir: Flucher J. McCrory, Jr.

**MISSION**

Plan, conduct, analyze, and report the results of developmental tests and studies to include airworthiness flight testing of Army aviation systems and associated materiel/systems. To provide test, test support, development support, and evaluations of aviation materiel/systems; and provide other aviation support for authorized customers as directed by the U.S. Army Test and Evaluation Command.

**CURRENT IMPORTANT PROGRAMS**

AH-64D Long Bow  
OH-58D Logistics Evaluation Program  
RAH-66 Comanche Program  
UH-1 Development for U.S. Border Patrol  
Special Operations Aircraft Development  
Brilliant Anti-Tank (BAT) System

**EQUIPMENT/FACILITIES**

Fifty five rotary- and fixed-wing aircraft are currently assigned (2 AH-1F, 1 AH-1S, 7 AH-64, 1 A/MH-6N, 3 C-23A, 3 CH-3E, 2 CH-47D, 1 EH-60, 6 OH-58A/C/D, 2 OH-58DI, 3 T-34C, 2 U-21A/H, 17 UH-1H, 5 UH-60A/L) as test beds. Helicopter Icing Spray System (HISS): A CH-47D with an integrated 1,800-gallon water tank and spray apparatus combined with a highly instrumented U-21A to provide cloud physics documentation, conducts in-flight icing evaluations under both artificial and natural conditions. Full flight test instrumentation capability exists. Analog and digital aircraft data can be recorded and/or telemetered to the ground. On-site data processing and display exist--real time and postmission. Capability to collect and process video, still, and high-speed pictures exists.

Aviation Technical Test Center  
Fort Rucker, AL 36362-5276  
(205) 255-8000

Commander: COL Joseph L. Bergantz  
Tech Dir: Flucher J. McCrory, Jr.

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.000	0.000	0.000
6.3	0.000	0.000	0.000
<b>Subtotal (S&amp;T)</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	12.584	9.568	22.152
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>12.584</b>	<b>9.568</b>	<b>22.152</b>
Procurement	5.808	4.002	9.810
Operations & Maintenance	1.884	1.218	3.102
Other	4.421	2.958	7.379
<b>TOTAL FUNDING</b>	<b>24.697</b>	<b>17.746</b>	<b>42.443</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

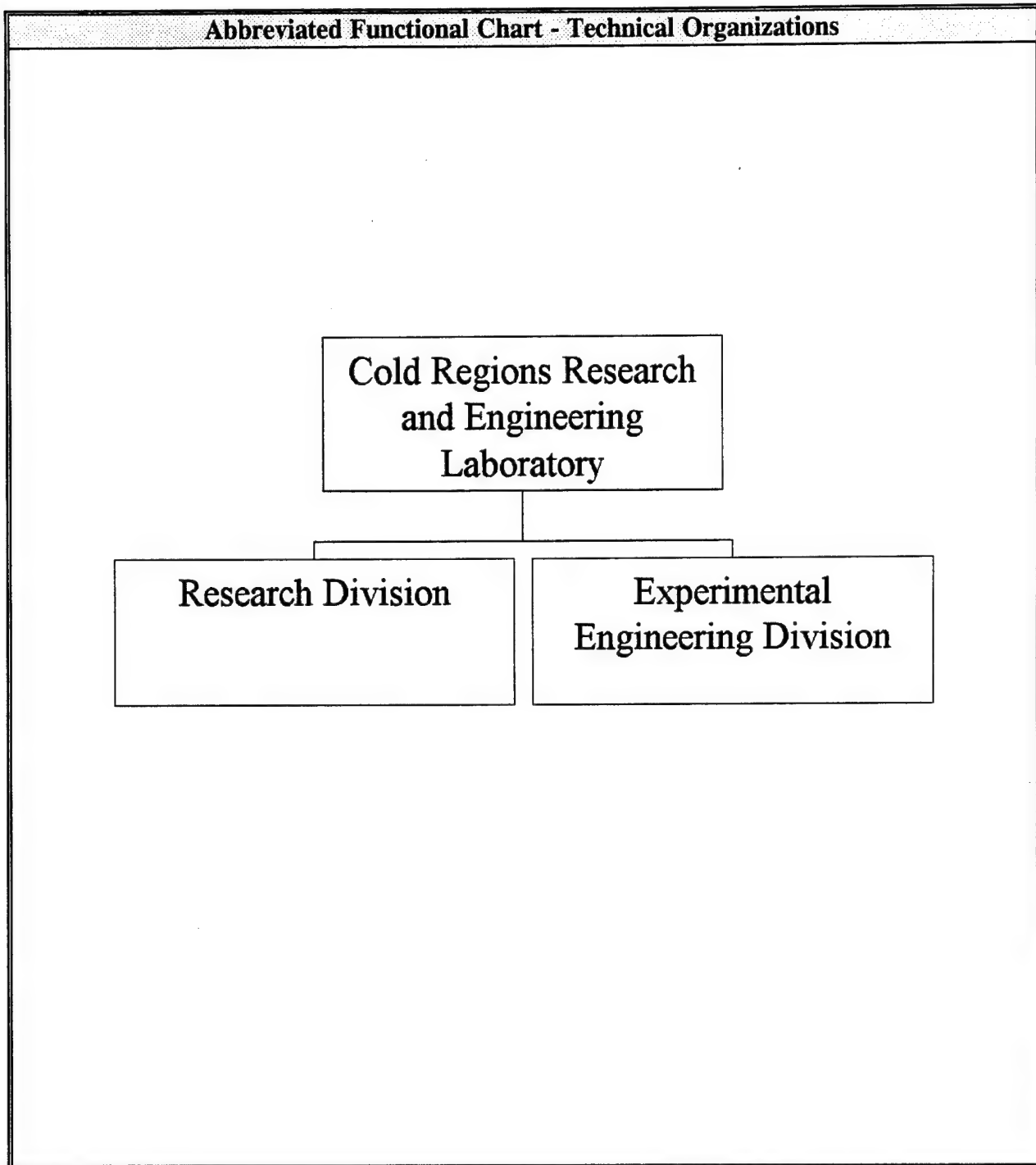
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	90	0	47	43
CIVILIAN	136	0	44	92
<b>TOTAL</b>	<b>226</b>	<b>0</b>	<b>91</b>	<b>135</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	0.000	<b>REAL PROPERTY</b>	3.500
ADMIN	93.000	* NEW CAPITAL EQUIPMENT	0.020
OTHER	229.000	<b>EQUIPMENT</b>	169.124
<b>TOTAL</b>	<b>322.000</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.550
ACRES	0	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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**Cold Regions Research & Engineering Laboratory**



**Cold Regions Research & Engineering Laboratory**

Hanover, NH 03755-1290

(603) 646-4100

Director: Dr. L. E. Link

Commander: Lt. Col. M. Nelson

**MISSION**

Advancing knowledge of the cold regions through scientific and engineering research and putting that knowledge to work for the Army, DoD and the Nation is the mission of the U.S. Army Cold Regions Research and Engineering Laboratory (USACRREL). Operating in cold regions requires appropriate equipment, training and doctrine, often very different from those used in more temperate conditions. These special requirements cover a broad range of military activities and can incur significant cost or capability penalties. Special challenges of cold regions exist on the more than 30% of the earth's surface that is covered by ice or underlain with permafrost. In addition, persistent and severe winter conditions occur in 50% of the earth's surface including areas of Europe, Asia and North and South America. Bosnia/Herzegovina and North and South Korea are areas of interest today that experience severe winter conditions that could significantly impact military operations. USACRREL provides the technology to allow the Army to operate effectively in cold regions environments to maintain national security and foster peace.

USACRREL R&D focuses on all aspects of the cold/winter environment and its implications for military activities in garrison or on the battlefield. The singular exception being individual soldier clothing and equipment. CRREL also addresses the nations winter water resources issues through the civil works program of the Corps of Engineers. Having a single-focused cold regions R&D organization that is the primary source of special expertise for DoD, and both serves and leverages resources and efforts of other federal, state, and local agencies and the private sector, is an investment strategy that has resulted in an outstanding and cost effective capability for DoD and the Nation.

**CURRENT IMPORTANT PROGRAMS**

USACRREL's current military programs are concentrated in three major R&D areas: Battlespace Environments, Civil Engineering, and Environmental Quality.

The Civil Engineering (CE) R&D generates technology for cost reductions in designing, building, operating, and maintaining military facilities in areas that experience harsh winter and severe cold weather, where infrastructure life-cycle costs and energy costs are high. USACRREL CE R&D efforts help solve critical DoD civil engineering problems related to training, mobilizing, deploying, sustaining, protecting, and employing U.S. Forces in cold environment at any time. Research in this area supports Tri-Service winter and cold regions issues.

**CURRENT IMPORTANT PROGRAMS**

The Environmental Quality R&D generally supports the test and evaluation of materiel systems through maintenance of training and test ranges, allowing their continued use while conserving the integrity of the environment. This is an especially difficult problem for ground vehicles and weapons systems that can have dramatic impacts on the flora and fauna of military ranges. The environmental quality area also has close ties to the Battlespace Environments area because of their common need for characterization and quantification of the geophysical processes that govern both the impact of the operating environment on military operations and systems, and the impact of activities on the quality of the natural environment. USACRREL research supports compliance, cleanup, and conservation goals focusing on special constraints imposed by winter conditions and cold climates. Research in this area supports Tri-Service cold unique environmental quality issues.

The Battlespace Environments research supports the design, test and evaluation of new systems through characterization, modeling and simulation of the highly varied world environmental conditions and their impact on systems (fielded or notional) performance. Winter and cold regions conditions are particularly difficult constraints for systems development and operation. Examples of direct support include icing problems for air vehicles, modeling and simulation of the background environment and its impact on smart weapons systems and mine/countermine systems, and the ability to project the environmental conditions in denied areas or into the future to assist in C4I. Research at CRREL serves the cold regions needs of all military services. Of particular significance is the support to the Navy for Arctic operations and to the Air Force and Army on the impact of winter conditions on ATR and smart weapons systems. Research on the low temperature performance of composites for the Army and Air Force supports the Advanced Materials pervasive function.

**Cold Regions Research & Engineering Laboratory****EQUIPMENT/FACILITIES**

USACRREL has a complex of low temperature laboratories and experimental research facilities not found anywhere else in the world. The main laboratory consists of 24 low temperature research laboratories with a temperature range down to -35°F. The 73,000 square foot Ice Engineering Facility houses three special-purpose research areas; a large low-temperature towing tank, a 100 foot long refrigerated flume for modeling rivers, and a large hydraulic-model room for studying ice impacts on civil works facilities, primarily locks and dams. The 29,000 square foot Frost Effects Research Facility (FERF) supports full-scale research on the impact of freeze-thaw cycles on pavements, foundations, and utility systems. The nationally unique FERF facility provides capability to simulate natural 3-D freeze-thaw cycles to study in-situation seasonal evaluation of combat equipment, development of effective doctrine and techniques, and support to DoD initiative on counter proliferation and treaty verification in cold environments. A DoD-unique 9000 square foot Low Temperature Materiel Test Facility provides additional capability focusing on winterization of military hardware systems. USACRREL's Low Temperature Materials Laboratory is a DoD-unique facility specially designed to investigate composite materials performance subject to low-temperature and thermal cycling for potential use for future Army Armor Vehicles. CRREL has access to two permafrost research sites in Alaska.

In addition, USACRREL houses the 16,400 square foot Corps Civil Works Remote Sensing/Geographic Information System Center, and a state-of-the-art DoD Cold Regions Technical Information Analysis Center (CRSTIAC). The 24,000 square foot CRSTIAC facility is home to the most comprehensive collection of cold regions science and engineering data in the world.

**Cold Regions Research & Engineering Laboratory**

Hanover, NH 03755-1290

(603) 646-4100

Director: Dr. L. E. Link

Commander: Lt. Col. M. Nelson

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.223	NA	0.223
6.1 Other	1.489	0.043	1.532
6.2 IED (Navy)	NA	NA	NA
6.2 Other	6.239	3.973	10.212
6.3	0.015	0.435	0.450
<b>Subtotal (S&amp;T)</b>	<b>7.966</b>	<b>4.451</b>	<b>12.417</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	5.426	1.391	6.817
6.7	0.000	4.039	4.039
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>13.392</b>	<b>9.881</b>	<b>23.273</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	7.805	3.484	11.289
Other	7.398	1.320	8.718
<b>TOTAL FUNDING</b>	<b>28.595</b>	<b>14.685</b>	<b>43.280</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

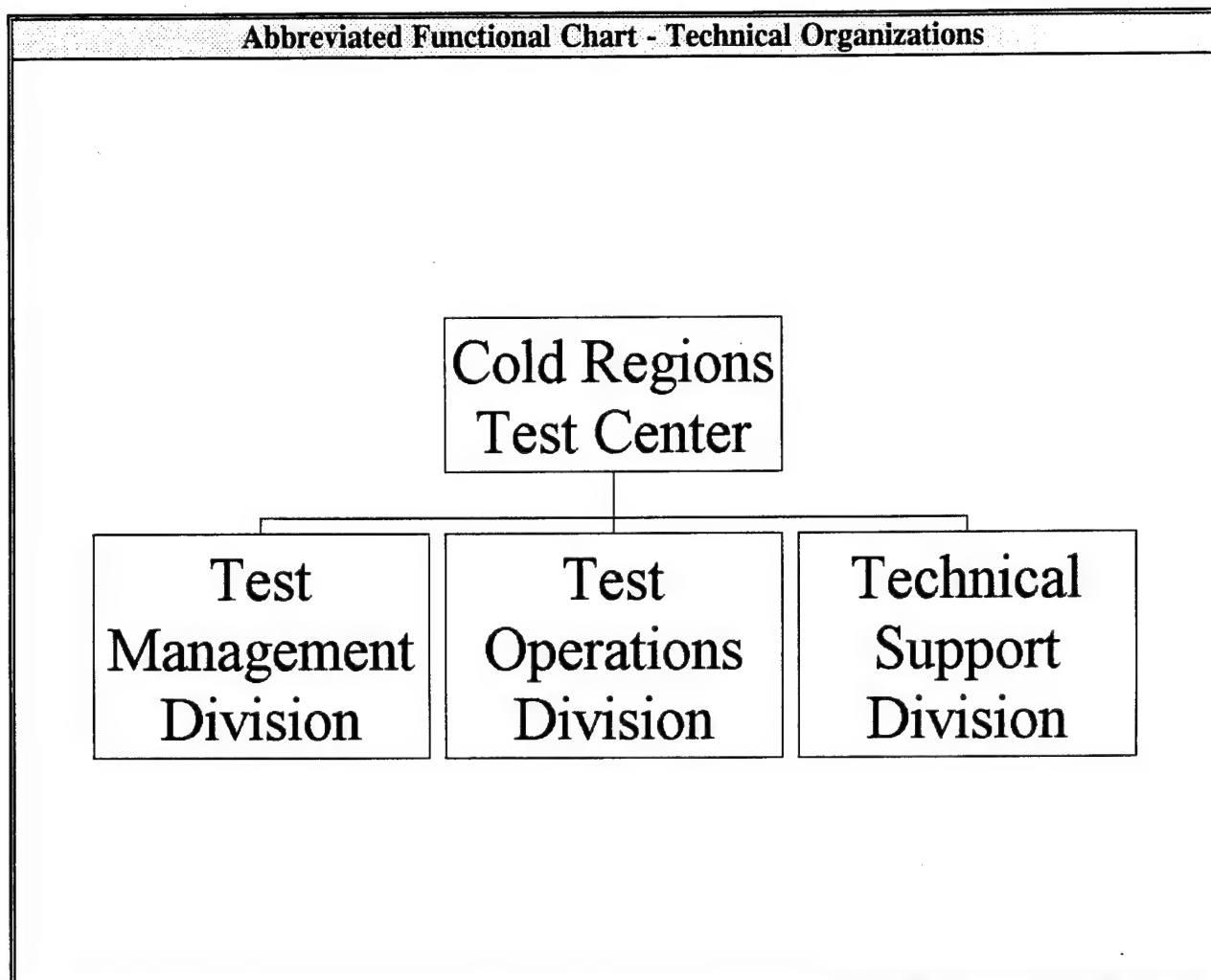
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	3	0	3	0
CIVILIAN	268	43	71	151
<b>TOTAL</b>	<b>271</b>	<b>43</b>	<b>74</b>	<b>151</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	211.655	<b>REAL PROPERTY</b>	34.000
ADMIN	58.850	* NEW CAPITAL EQUIPMENT	1.612
OTHER	64.510	<b>EQUIPMENT</b>	25.000
<b>TOTAL</b>	<b>335.015</b>	* NEW SCIENTIFIC & ENG. EQUIP.	1.319
<b>ACRES</b>	<b>129</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## Cold Regions Test Center



**Cold Regions Test Center**

Fort Greely, AK 96508-3110  
(907) 873-4215

Commander: LTC Robert L. Cox, Jr.  
Tech Director: Mr. Jerold G. Barger

**MISSION**

Plan, conduct and report the results of cold regions, mountain and northern environmental phases of developmental and other tests. Review plans and monitor developmental testing planned or conducted by proponent materiel developers, producers, and contractors in accordance with integrated testing cycle policies.

**CURRENT IMPORTANT PROGRAMS**

M2A2 Bradley fighting vehicle, arctic follow-on modifications.  
M249, 5.56mm Squad automatic weapon collapsible buttstock.  
XM93E1 Nuclear, biological, and chemical reconnaissance system.  
M1A2 Abrams tank system - cold regions phase.  
Family of medium tactical vehicles.

**EQUIPMENT/FACILITIES**

Test area 630,000 acres. 500,000 acre isolated impact area. 50km unobserved range. Large restricted air space/unrestricted firing to 100,000 ft. ordinate. Coordination with FAA can effect unrestricted ordinate. 3rd order survey points. Good secondary roads. Vehicle test courses and extensive cross country terrain ranges available. Photo lab/limited maintenance capability and engineer support available. Instrumentation available for most items. Statistical/maintenance evaluation/human factor capabilities and computer support available. Ambient temps to -50°F occasionally, below 0°F from November through March.

**Cold Regions Test Center**  
Fort Greely, AK 96508-3110  
(907) 873-4215

Commander: LTC Robert L. Cox, Jr.  
Tech Director: Mr. Jerold G. Barger

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.000	0.000	0.000
6.3	0.000	0.000	0.000
<b>Subtotal (S&amp;T)</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	5.420	1.073	6.493
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>5.420</b>	<b>1.073</b>	<b>6.493</b>
Procurement	0.300	0.000	0.300
Operations & Maintenance	0.000	0.000	0.000
Other	3.400	0.000	3.400
<b>TOTAL FUNDING</b>	<b>9.120</b>	<b>1.073</b>	<b>10.193</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

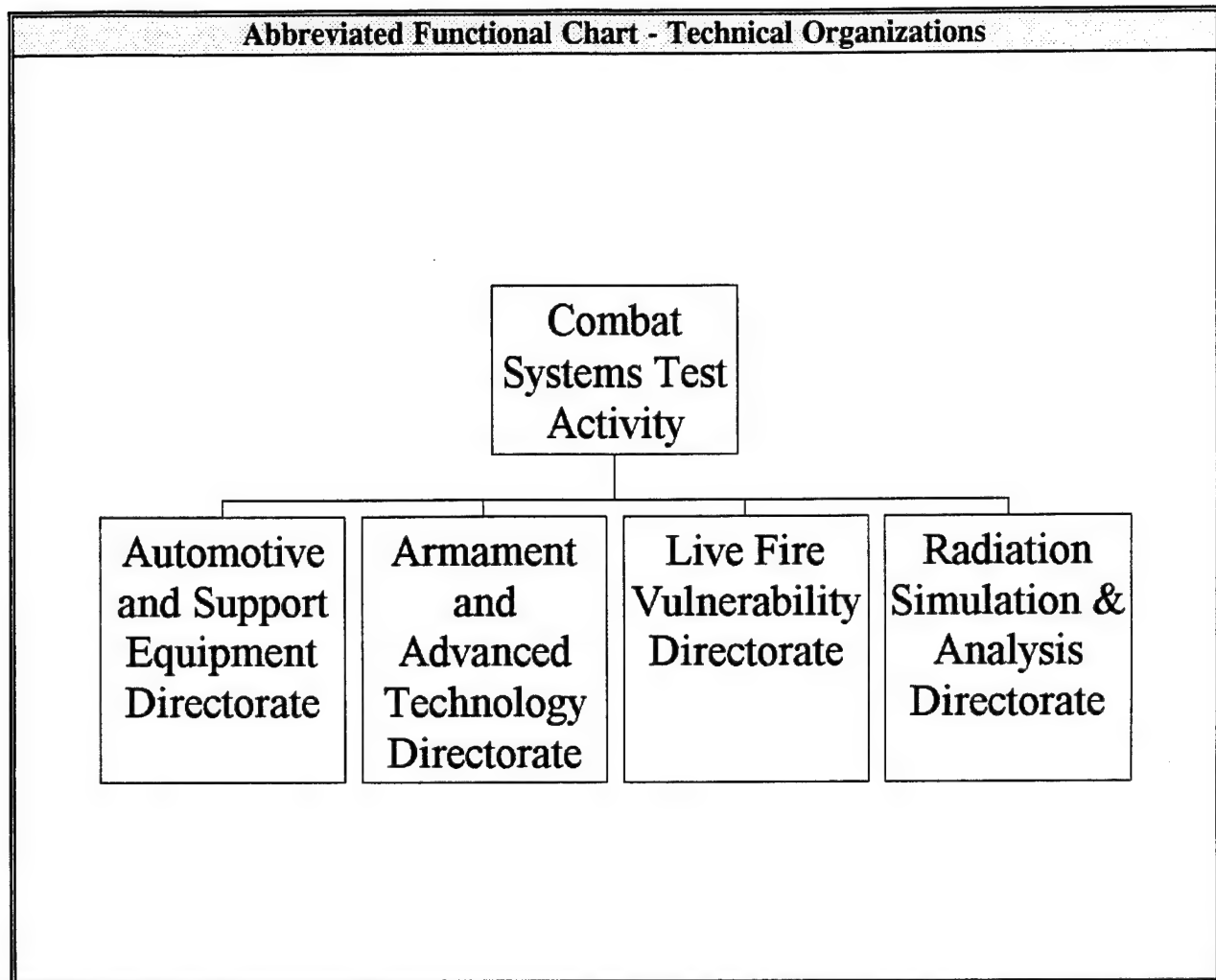
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	75	0	6	69
CIVILIAN	38	0	8	30
<b>TOTAL</b>	<b>113</b>	<b>0</b>	<b>14</b>	<b>99</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	1.400	<b>REAL PROPERTY</b>	14.300
ADMIN	18.200	* NEW CAPITAL EQUIPMENT	0.000
OTHER	198.400	<b>EQUIPMENT</b>	23.109
<b>TOTAL</b>	<b>218.000</b>	* NEW SCIENTIFIC & ENG. EQUIP.	1.400
ACRES	0	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Combat Systems Test Activity



**Combat Systems Test Activity**

Aberdeen Proving Grd, MD 21005-5059  
(410) 278-3574

Commander: COL James Kriebel  
Technical Dir: James W. Fasig

**MISSION**

Combat Systems Test Activity is the most diverse test facility within DoD, testing a broad spectrum of military weapons systems and equipment including armored vehicles, guns, ammunition, trucks, bridges, generators, night vision devices, and individual equipment (boots, uniforms, helmets, etc). As a multi-purpose proving ground, with a temperate climate, our primary mission is to plan, conduct, analyze and report on projects supporting research, development, test and evaluation (RDTE), design, engineering, production, and surveillance tests for DoD and other government agencies, contractors, foreign governments, and private industry. In this single location, CSTA can subject an item to a full range of tests from automotive endurance and full weapons performance with environmental extremes, to full-scale live fire vulnerability/survivability/lethality testing utilizing an extensive array of test ranges/facilities, simulators and models. In addition to testing domestic systems, we fully exploit foreign systems to assess the enemy threat. We also develop state-of-the-art test procedures (DoD, international), methodology and instrumentation in order to meet the test requirements of advancing military technologies.

**CURRENT IMPORTANT PROGRAMS**

Family of Medium Tactical Vehicles (FMTV)  
M1A2 Abrams Production Qualification Test (PQT)  
M830A1 Cartridge  
M934 120MM Cartridge Production Qualification Test  
Tactical Quiet Generator Program  
Armored Gun System

**EQUIPMENT/FACILITIES**

World-renowned automotive test/obstacle courses; numerous interior and exterior firing ranges; environmental simulation capabilities including rough-handling and vibration, electromagnetic interference and environmental conditioning capabilities; full transportability test capability to include rail, roadability, MIL-STD 209 pull and tie-down, internal and external air transport; UNDEX test pond for underwater explosives testing and Depleted Uranium Containment Fixture (Superbox) for live fire vulnerability and lethality testing; sophisticated non-destructive test facilities; robotics test facilities; pulse radiation facility; Firing Impulse Simulator; state-of-the-art industrial complex which includes maintenance and experimental fabrication capabilities.

## Combat Systems Test Activity

Aberdeen Proving Grd, MD 21005-5059

(410) 278-3574

Commander: COL James Kriebel

Technical Dir: James W. Fasig

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	1.911	0.831	2.742
6.3	1.911	0.831	2.742
<b>Subtotal (S&amp;T)</b>	<b>3.822</b>	<b>1.662</b>	<b>5.484</b>
6.4	0.000	0.000	0.000
6.5	6.464	2.814	9.278
6.6	26.920	20.232	47.152
6.7	0.000	0.000	0.000
Non-DOD	1.911	0.831	2.742
<b>TOTAL RDT&amp;E</b>	<b>39.117</b>	<b>25.539</b>	<b>64.656</b>
Procurement	19.558	8.472	28.030
Operations & Maintenance	2.161	1.120	3.281
Other	11.889	5.144	17.033
<b>TOTAL FUNDING</b>	<b>72.725</b>	<b>40.275</b>	<b>113.000</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	4.400

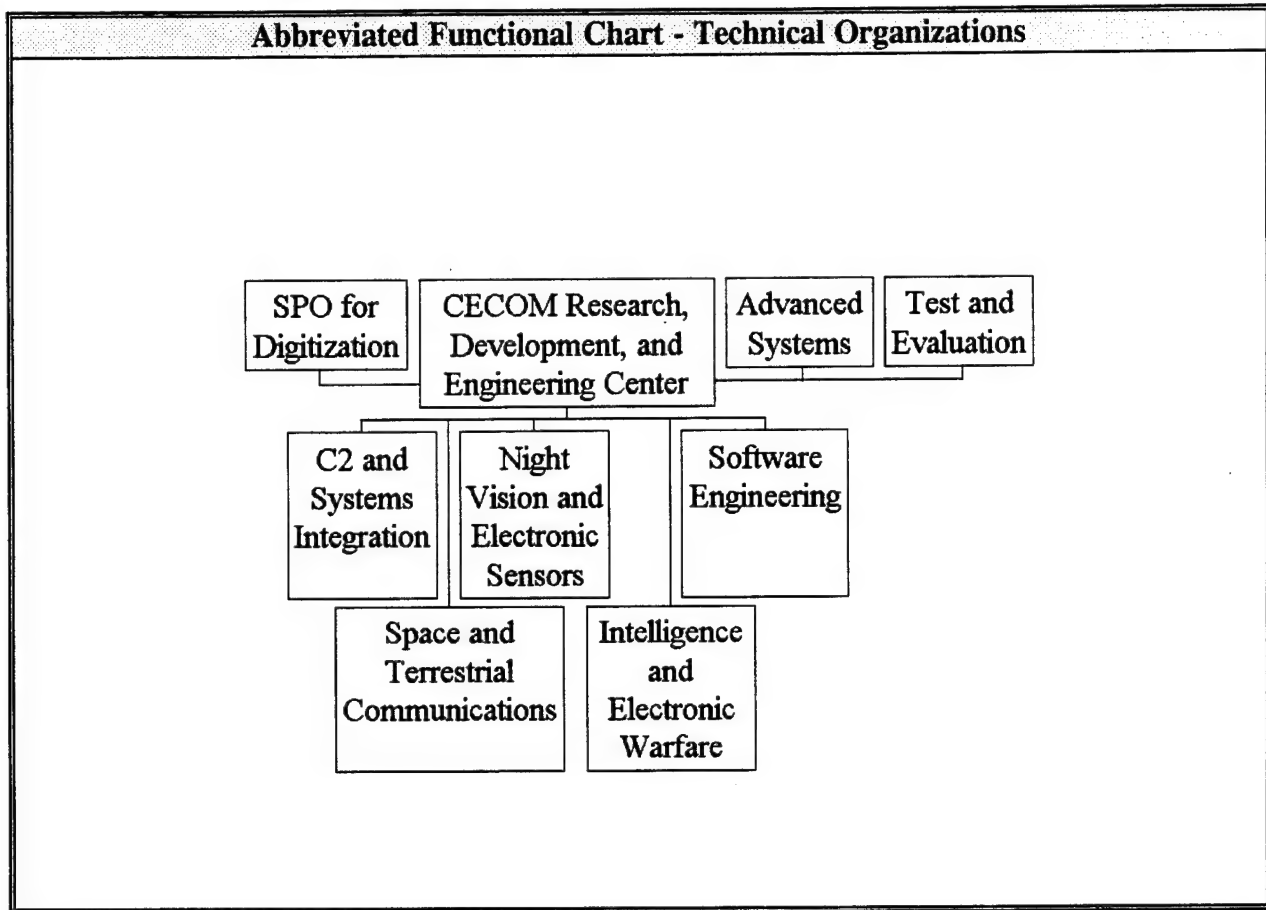
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	168	0	12	156
CIVILIAN	1,019	7	310	702
<b>TOTAL</b>	<b>1,187</b>	<b>7</b>	<b>322</b>	<b>858</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	161.507	<b>REAL PROPERTY</b>	56.000
ADMIN	164.869	* NEW CAPITAL EQUIPMENT	2.635
OTHER	909.423	<b>EQUIPMENT</b>	202.485
<b>TOTAL</b>	<b>1,235.799</b>	* NEW SCIENTIFIC & ENG. EQUIP.	13.785
<b>ACRES</b>	<b>56,707</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Communications-Electronics Research, Development & Engineering Center



**Communications-Electronics Research, Development & Engineering Center**

Ft. Monmouth, NJ 07703-5209  
(908) 532-0829

Director: Mr. Robert F. Giordano  
Bus Anal Office: Constance Carnevale

**MISSION**

The Communications-Electronics Command Research, Development & Engineering Center (CECOM RDEC), headquartered at Ft. Monmouth, NJ, is the AMC Center for research, development and engineering in Command and Control, Communications, Computers and Intelligence (C4I); Electronic Warfare; Night Vision and Electro-Optics; Countermine; and Avionics. The Center's mission is focused on providing support to the PEO's and PM's; developing and acquiring superior technologies; developing, acquiring, testing and evaluating non-major systems; and sustaining and enhancing systems and equipment.

The CECOM RDEC will promote and nurture a proactive atmosphere which embraces continuous improvement by:

1. Providing the highest quality support to American Armed Forces.
2. Delivering superior technologies, products and services for: Owning the Night, Owning the Spectrum, Knowing the Enemy, Digitization of the Battlefield, Software Development and Sustainment, Systems Architecture, and Global Seamless Communications.
3. Creating an organization committed to development of its workforce; attainment of individual fulfillment; and team effectiveness.

**CURRENT IMPORTANT PROGRAMS**

1. CECOM RDEC has been designated as the System Engineer for Digitizing the Battlefield for the Army. The digital battlefield is a total systems approach, integrating communications across all functional areas to enhance the commander's ability to make decisions in real time. Technology insertion into current and emerging systems will redefine the way we fight by acting as a force multiplier, enhancing the combat effectiveness of the warfighter. It will provide the soldier and commander with a common picture of the battlefield, provide real time situational awareness, combat identification, horizontal integration of the combat arms team and battlefield synchronization through coordinated command and control.

**CURRENT IMPORTANT PROGRAMS**

2. The Horizontal Integration of Second Generation Forward Looking Infrared (FLIR) Technology into new and existing weapon platforms is a key element in the Army's objective to "Own the Night." HTI will provide a balanced, synchronized warfighting capability across the combined armed forces. CECOM RDEC has made significant contributions to the DA established Special Task Force by designing and developing the Second Generation FLIR critical components under its Standardized Advanced Dewar Assembly (SADA) program. Second Generation FLIRS will not only provide substantial increased range performance and decreased target acquisition time compared to First Generation FLIRs, but will also provide a major contribution to Digitizing the Battlefield through image transfer and automation.
3. Combined Arms Command and Control ATD. Real time command and control for coordinated and synchronized combined arms operations on the battlefield. The effort develops a digital architecture demonstrating command and control functionality for shared situational awareness, a common battlefield view, and horizontal information exchange including target handover for a Brigade and Below combined arms task force.
4. The 21st Century Land Warrior program is the latest soldier-machine interface effort to provide data and imagery to the warfighter in the field. Work has been started on the Lightweight Leader Computer (LLC), which uses a pocket size computer to display digital maps and messages and interfaces to Global Positioning System receivers. It will integrate infantry leaders at squad, platoon, and company echelons into the digital battlefield using present day technology.
5. The Countermine Top Level Demonstration, a joint demonstration (Army, Marine Corps), provides a realistic, cohesive, and structured strategy for addressing the future mine warfare threat. It will integrate countermine capabilities with C3I linkage to maintain Army and Marine Corps mobility, survivability, and agility.

## Communications-Electronics Research, Development &amp; Engineering Center

**EQUIPMENT/FACILITIES (Continued)****DIGITAL INTEGRATED LAB/TESTBED:**

The CECOM RDEC has developed a dynamic world-class integrated facility that can be rapidly reconfigured to replicate diverse existing and evolving tactical C3I/EW battlefield environments. The Digital Integrated Lab/Testbed (DIL) consists of interconnected distributed laboratories, testbeds, Battle Labs, field sites, contractor testbeds, and simulations, along with technical engineering expertise at these facilities. The connected systems, combined with modeling and simulation, allow end-to-end testing of an individual system's capability to operate in the tactical environment. This extensive testing and experimentation capability allows prototypes, requirements, and deficiencies in C3I/EW systems to be examined, developed, evaluated, or refined in conjunction with the users, combat and materiel developers, industry, and national laboratories. Command and Control, IEW, and Communications system simulation models are available for rapid prototyping of new C3I architectures and evaluating new protocols and system improvements.

External sites that are connected to the Digital Integrated Lab/Testbed via the Army Interoperability Network (AIN) and the Defense Simulation Internet (DSI) include Battle Command Battle Labs at Ft. Gordon, Georgia and Ft. Leavenworth, Kansas; Army Battle Command Systems (ABCS) Laboratory, Ft. Monmouth, New Jersey; Joint Interoperability Test Center, Ft. Huachuca, Arizona; and other government and contractor locations.

**CECOM RDEC facilities include:**

- Command and Control Laboratory
- Joint Advanced Demonstration Environment (JADE) Testbed
- Communications Systems Design Center
- Software Prototyping and Integration Laboratory
- C3 Integration Laboratory
- Commercial Communications Technology Laboratory
- Simulation and Modeling Laboratories
- Electronic Warfare Survivability Integration Laboratory
- Tactical Data Fusion Laboratory
- Local Area Communication Integration Laboratory
- Advanced Sensor Evaluation Facility
- Appliqué Testbed

The DIL has been designated as the technology testbed for the Digital Battlefield. All communication/digital systems slated for fielding to the Experimentation Force (EXFOR) is to be certified by the CECOM DIL.

## Communications-Electronics Research, Development &amp; Engineering Center

Ft. Monmouth, NJ 07703-5209

Director: Mr. Robert F. Giordano

(908) 532-0829

Bus Anal Office: Constance Carnevale

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	1.284	NA	1.284
6.1 Other	1.841	2.397	4.238
6.2 IED (Navy)	NA	NA	NA
6.2 Other	30.847	43.418	74.265
6.3	18.896	86.623	105.519
<b>Subtotal (S&amp;T)</b>	<b>52.868</b>	<b>132.438</b>	<b>185.306</b>
6.4	6.946	12.767	19.713
6.5	12.311	19.078	31.389
6.6	9.963	13.722	23.685
6.7	5.559	20.798	26.357
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>87.647</b>	<b>198.803</b>	<b>286.450</b>
Procurement	41.718	73.058	114.776
Operations & Maintenance	31.337	85.198	116.535
Other	4.777	25.913	30.690
<b>TOTAL FUNDING</b>	<b>165.479</b>	<b>382.972</b>	<b>548.451</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

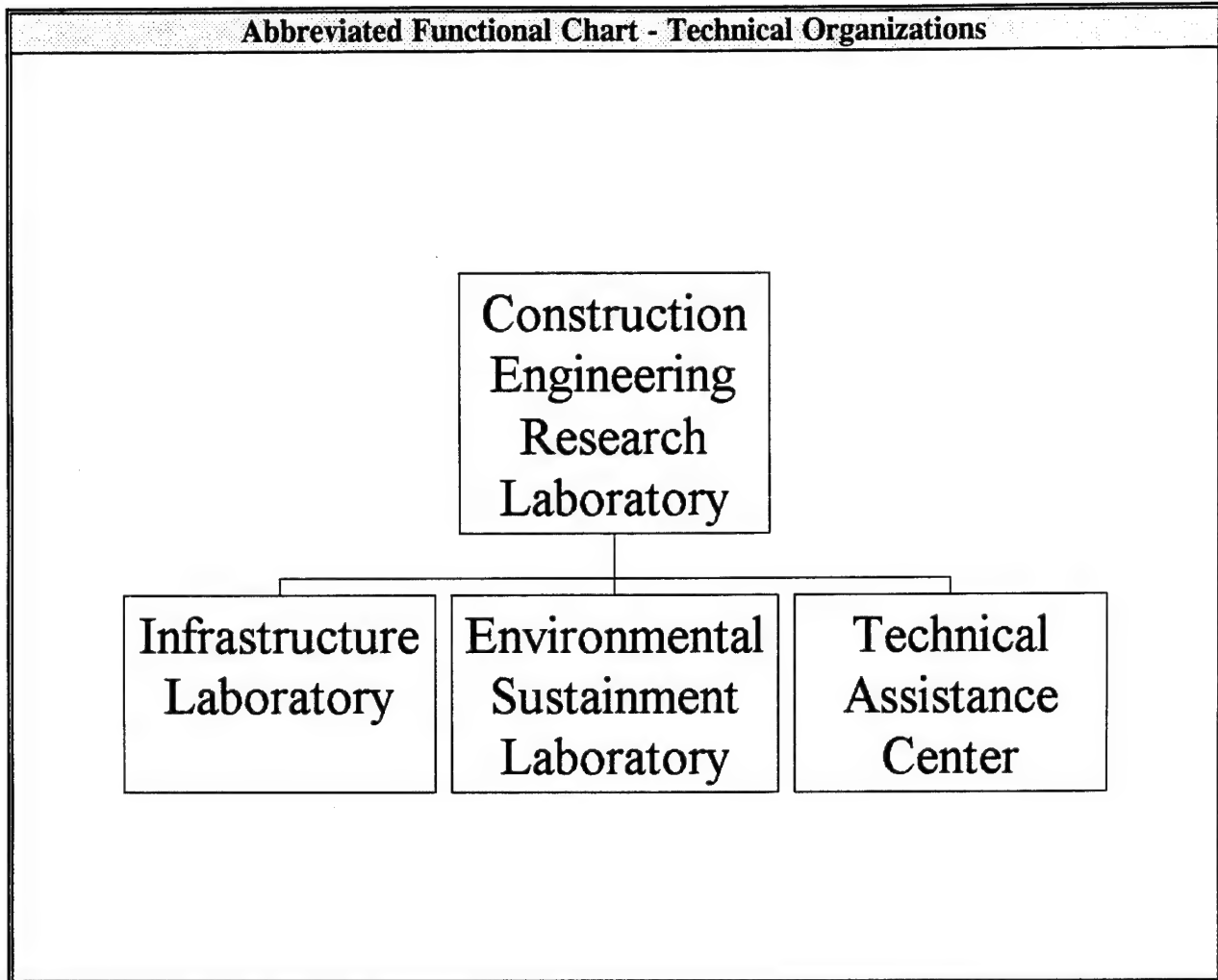
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	122	1	11	110
CIVILIAN	2,409	68	1,461	880
<b>TOTAL</b>	<b>2,531</b>	<b>69</b>	<b>1,472</b>	<b>990</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	421.400	<b>REAL PROPERTY</b>	65.600
ADMIN	361.900	* NEW CAPITAL EQUIPMENT	3.700
OTHER	16.900	<b>EQUIPMENT</b>	243.100
<b>TOTAL</b>	<b>800.200</b>	* NEW SCIENTIFIC & ENG. EQUIP.	2.900
<b>ACRES</b>	<b>2299</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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**Construction Engineering Research Laboratories**



**Construction Engineering Research Laboratories**

Champaign, IL 61826-9005  
(217) 373-7216

Cmdr/Acting Dir: LTC David J. Rehbein  
Technical Dir: Dr. Michael J. O'Connor

**MISSION**

USACERL's primary mission is to equip and sustain Military Commanders with affordable products of innovative technologies, rapidly fielded, for installations to serve as Power Projection Platforms, Home to the Force, and Work and Training Bases as designated in the National Military Strategy for the 21st Century. The requirement to shape our installations to meet the 21st Century missions demands innovative processes/systems and affordable technologies, integrated across the entire spectrum of installation functions, and focused on the specific requirements of installation management/base operations, environmental stewardship and training. USACERL, co-located with the University of Illinois at Urbana-Champaign, is DoD's unique critical mass to manage and perform the innovative research and technical assistance to address this challenge. Under the Tri-Service Engineer Panel, USACERL has the lead for basic and applied research and engineering studies in support of the Army's program of planning, programming, construction, revitalization, operation, maintenance and repair of conventional military facilities world-wide, installation environmental management, environmental and spatial modeling, resource modeling and simulation, design and construction of pollution control facilities, and development of environmental planning systems to support the Army in training, readiness, and mobilization missions. Additionally, USACERL performs R&D to repair, maintain, and rehabilitate civil works facilities. USACERL provides support for demonstrations of products and systems developed in our research and engineering studies for USACE MSCs, Army MACOM HQs, installations and other DoD customers.

The issues of infrastructure design and sustainability, energy consumption, pollution control, and environmental compliance and stewardship represent critical concerns and rapidly increasing costs to the Army, DoD, and the nation. USACERL provides critical and integrated solutions to these issues, expertise to help military installations implement new technologies and a history of hands-on involvement with installation customers. One example, the Integrated Training Area Management programs, being fielded to provide critical management for training ranges, is part of the TAP (Total Army Plan); TRADOC estimates a return on investment in ITAM of 27:1.

To maintain our competitive advantage, to remain cost competitive, and to cope with the explosive growth of technology options, we aggressively leverage our technology advances through the forming of consortia, cooperation with other government and sister services' laboratories, academia, the private sector, and the international community for product generation and sustainment. The in-house expertise consists of the optimal mix of key in-house research, development and technical assistance capability not provided from outside the Army or DoD; this capability is leveraged with world-class university research and technical assistance centers to assure high payoff technologies in those areas critical to providing the DoD and Army customers products which give them a unique operational edge.

**CURRENT IMPORTANT PROGRAMS**

Building Design and Rehabilitation for Seismic Loads.  
Comprehensive Energy Conservation Strategy (including Ft. Hood Demo).  
Concurrent Engineering.  
Training Land Carrying Capacity.  
Pollution Controls for Military Manufacturing Processes.  
Defense Environmental Network and Information eXchange (DENIX).  
Preserving Training Capacity under Protected Species Habitat Constraints.

**EQUIPMENT/FACILITIES**

**Biaxial Shock Test Machine-BSTM:** A national R&D shock test asset; The only large capacity (6 ton) high frequency, high acceleration shaketable in the western world; capable of programmable, simultaneous vertical and horizontal motions; being upgraded in FY96 to add full triaxial capability; estimated replacement cost is \$15-20 million.

**Ion Plating Systems:** Custom-designed to meet highly specialized research specifications to do small scale prototype thin film coating experiments; only facility of this kind (plasma-assisted physical vapor disposition) in the Army.

**Heating, Ventilation and Air Conditioning Test Facility:** A large "mini-facility" with four rooms (zones that can be thermally controlled separately to replicate a variety of HVAC systems and conditions, including dual or single duct and variable or constant air volume conditions; includes ventilation system, hot water supply loops, chilled water supply loops, HVAC systems configuration, facility controls, and data acquisition system; used to validate the energy thermodynamics analysis program and to analyze performance of proposed standard digital control panels; unique facility in DoD.

**Acoustics Lab: Impulse Noise Technology Center;** one of a kind in the world to quantify impact and mitigation technology for cannon, helicopter, blast and small caliber weapon fire on human endurance and the natural ecosystem; unique facility in DoD.

**Integrated Simulation Language Laboratory:** Twelve SUN SPARC stations and a Silicon Graphics Iris Crimson Virtual Reality engine, networked with the DoD simulation community via INTERNET to develop and test an advanced object-oriented, collaborative software development environment for producing the next generation of distributed, interactive simulations for DoD.

**Construction Engineering Research Laboratories****EQUIPMENT/FACILITIES**

**Paint Laboratory:** Specialized equipment necessary to perform Qualified Product List testing on paints used by the Army (an "honest broker" function); capability to manufacture lab size batches of experimental coatings and perform both real-time and accelerated performance testing of coatings; capability to perform forensic analysis of paint samples.

**Spatial Planning & Management Center:** Facility to incorporate GIS into Master Planning R&D with state-of-the-art hardware and software for research at USACERL and partnering with the University of Illinois' Department of Urban and Regional Planning in the College of Fine and applied Arts.

**Equipment and facilities co-located at the University of Illinois, Urbana-Champaign:** In 1966, the U.S. Army Corps of Engineers proposed a new laboratory for engineering research to support military construction. In national competition in 1967, the University of Illinois at Urbana-Champaign was selected for co-locating USACERL. This unique relationship between USACERL and the University of Illinois, annually cited as one of the top three engineering schools in the nation, has been touted by HQ USACE as a prime example of "reinventing Government." Of approximately 900 personnel working at USACERL, over 450 are University of Illinois faculty, staff or students. Designated as an allied agency of the University of Illinois, \$250-500 million of University of Illinois research laboratory equipment is accessible.

**Construction Engineering Research Laboratories**

Champaign, IL 61826-9005

(217) 373-7216

Cmdr/Acting Dir: LTC David J. Rehbein

Technical Dir: Dr. Michael J. O'Connor

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.038	NA	0.038
6.1 Other	1.507	1.271	2.778
6.2 IED (Navy)	NA	NA	NA
6.2 Other	13.108	16.128	29.236
6.3	2.439	6.572	9.011
<b>Subtotal (S&amp;T)</b>	<b>17.092</b>	<b>23.971</b>	<b>41.063</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	5.167	1.226	6.393
6.7	0.000	0.000	0.000
Non-DOD	1.765	1.381	3.146
<b>TOTAL RDT&amp;E</b>	<b>24.024</b>	<b>26.578</b>	<b>50.602</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	13.902	25.676	39.578
Other	0.028	0.110	0.138
<b>TOTAL FUNDING</b>	<b>37.954</b>	<b>52.364</b>	<b>90.318</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.076

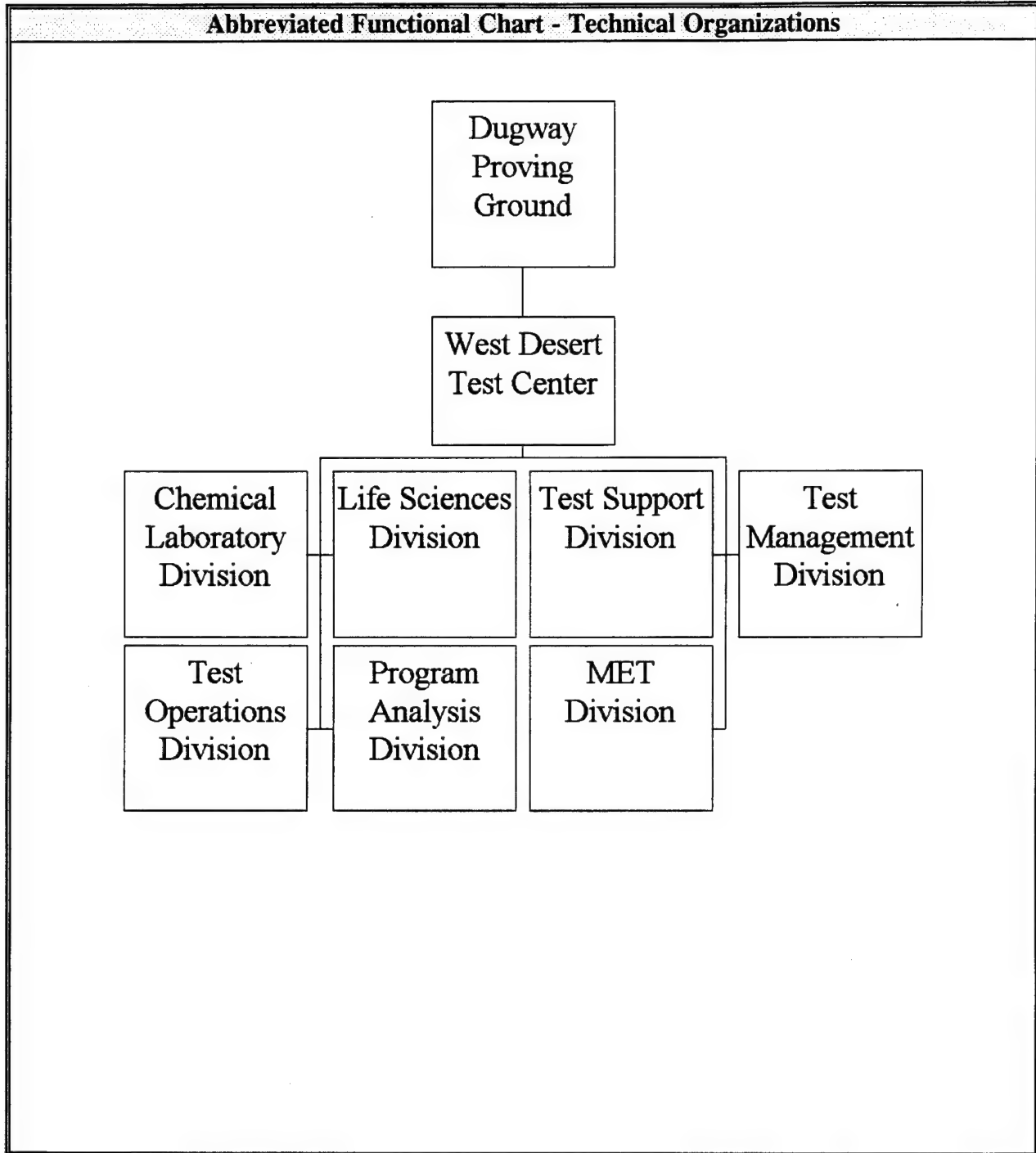
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	1	0	1	0
CIVILIAN	383	52	177	154
<b>TOTAL</b>	<b>384</b>	<b>52</b>	<b>178</b>	<b>154</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	118.896	<b>REAL PROPERTY</b>	0.000
ADMIN	60.428	* NEW CAPITAL EQUIPMENT	0.000
OTHER	29.449	<b>EQUIPMENT</b>	20.189
<b>TOTAL</b>	<b>208.773</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.520
<b>ACRES</b>	<b>33</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Dugway Proving Ground



**Dugway Proving Ground**  
Dugway, UT 84022-5000  
(801) 831-3314

Commander: Eugene A. Fuzy  
Executive Asst: Mr. Scot A. Bridges

### MISSION

Plan, conduct, analyze and report the results of exploratory, developmental, and production tests and delivery systems. Operate the proving ground as a DoD Major Range and Test Facility Base (MRTFB). DPG is the DoD-designated Chemical and Biological Defense Test and Evaluation Reliance test site.

Test conventional and illuminating artillery, mortars and rockets, as well as land and air vehicles. Perform tests of all material commodities to assess chemical and biological hardness and contamination/decontamination survivability. Test procedures and by-products of chemical and conventional weapons demilitarization and perform tests and develops procedures for on-site verification inspections for chemical weapons treaties. Dugway provides the base of operation for the Joint Services Project, Chemical and Biological Joint Contact Point and Test, which provides chemical and biological defense information and operationally oriented tests and analysis to the Services and CINCS.

### CURRENT IMPORTANT PROGRAMS

Research, development and laboratory investigations. Joint-operations chemical and biological defense tests and studies for CINCS and Services. Munitions development/acceptance and production testing. Environmental studies to support DPG and Army programs.

### EQUIPMENT/FACILITIES

Instrumented grids for chemical, biological and smoke/obscurant systems. Artillery range for conventional and chemical metal parts. Ballistics and dissemination tests with field sample, sample mass analysis, meteorological (auto data acquisition and MESOMET network) system. Physical and environmental test facility (MIL SPEC 810) chambers for total agent containment. Operations supported by meteorological research on behavior of clouds. Chemical, life science technology, ecological survival of DPS. Capability for planning analysis, evaluation of tests and operations research. Labs equipped for wide range of chemical, microbiological, toxicological, immunological and pollution studies. Technical and mass array of fluorescent air tracers. External-communication and range safety system. Outstanding features are: large land area, restricted air space, long and flat artillery ranges, projectile recovery, sonic and electromagnetic sterility and diverse technical and scientific skills.

Dugway Proving Ground  
Dugway, UT 84022-5000  
(801) 831-3314

Commander: Eugene A. Fuzy  
Executive Asst: Mr. Scot A. Bridges

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.690	0.434	1.124
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.000	0.000	0.000
6.3	0.000	0.000	0.000
<b>Subtotal (S&amp;T)</b>	<b>0.690</b>	<b>0.434</b>	<b>1.124</b>
6.4	4.250	2.491	6.741
6.5	0.000	0.000	0.000
6.6	30.439	17.877	48.316
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>35.379</b>	<b>20.802</b>	<b>56.181</b>
Procurement	1.000	1.000	2.000
Operations & Maintenance	6.000	11.000	17.000
Other	6.000	6.000	12.000
<b>TOTAL FUNDING</b>	<b>48.379</b>	<b>38.802</b>	<b>87.181</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	15.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	72	0	14	58
CIVILIAN	562	19	72	471
<b>TOTAL</b>	<b>634</b>	<b>19</b>	<b>86</b>	<b>529</b>

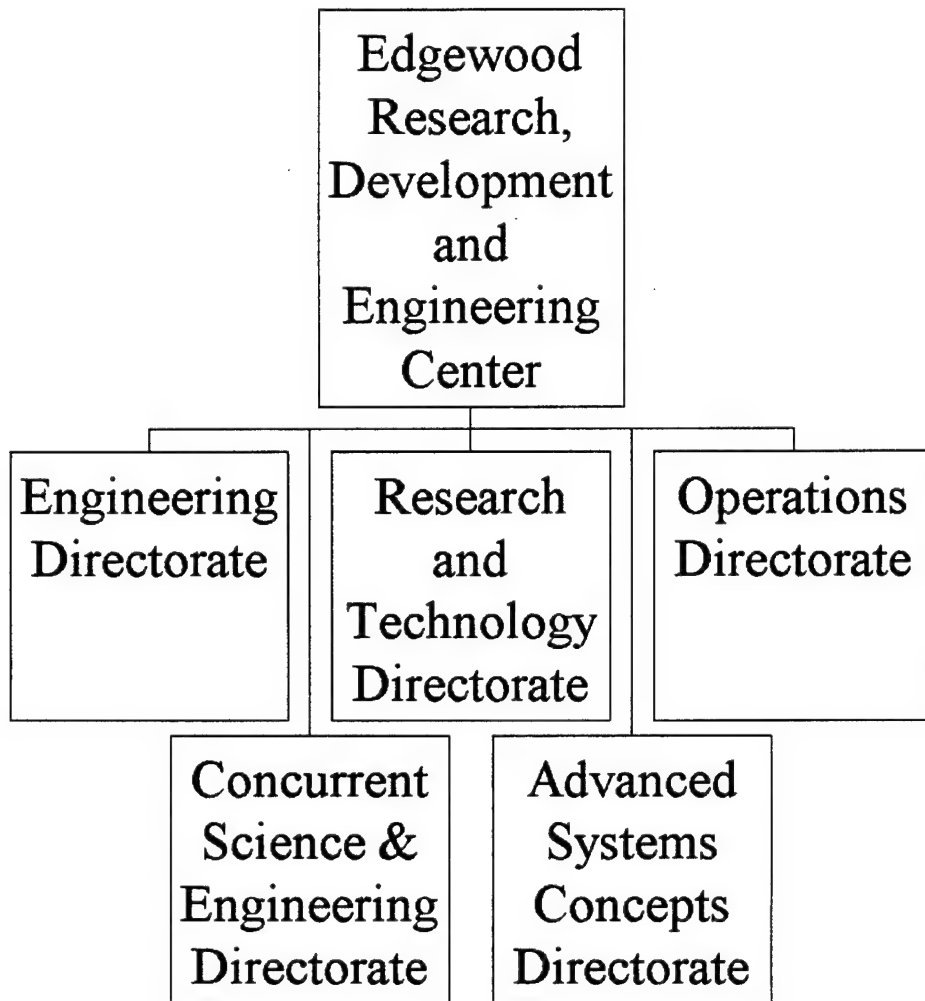
SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	219.000	<b>REAL PROPERTY</b>	160.000
ADMIN	189.000	* NEW CAPITAL EQUIPMENT	0.000
OTHER	2,163.000	<b>EQUIPMENT</b>	110.000
<b>TOTAL</b>	<b>2,571.000</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>798,855</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## Edgewood Research Development and Engineering Center

## Abbreviated Functional Chart - Technical Organizations



**Edgewood Research Development and Engineering Center**

Aberdeen PG, MD 21010-5423  
(410) 671-3838

Technical Dir: Mr. Joseph J. Vervier

**MISSION**

A research, development and engineering agency for executing the chemical and biological defense programs for the Army and Joint Services (JS). Provide research, development and acquisitions as well as life cycle engineering support for chemical/biological defense and smoke/obscurant equipment under DODD 5160.5. Act as DoD lead lab for the JS chemical/biological/smoke technology base.

**CURRENT IMPORTANT PROGRAMS**

- Nuclear, Biological and Chemical (NBC) Reconnaissance, Detection and Identification.
- Individual and Collective Protection.
- NBC Decontamination.
- Smoke and Obscurants and Target Defeating Materials.
- Chemical Treaty Verification
- Chemical and Biological Remediation

**EQUIPMENT/FACILITIES**

Major equipment is contained in a complex of R&D engineering/laboratory areas and includes: Process engineering facility; Production and facility design chamber for studies of respiratory bio-protection design drivers; Simulant agent challenge test chamber; Rubber/elastomer mold facility; Specialized chemical agent labs; Pyrotechnic mixing, loading, handling facility; Subsonic, supersonic, transonic wind tunnel; Complete analytical chemistry (tract analysis/tandem mass spectrometry); Obscurant test chambers for transmission measurements; Laser spectroscopy lab; Robotic toxic agent lab; CAD/CAE/CAM network; Super toxic facility; Design Evaluation Chemical Surety Lab; Decontamination/Detoxification Facility; Explosive test chamber; Toxic Dissemination Test Chamber; Inhalation Toxicology Laboratories; Molecular Modeling Facility; Microland Laboratory with electron microscopy and surface spectroscopy; Experimental Fabrication Facility; Nephelometry Laboratory/Single Particle Laboratory; Smoke Breeze Tunnel; Controlled Environment Soil- Core Microcosm Unit Chambers; Decontamination Test Facility.

## Edgewood Research Development and Engineering Center

Aberdeen PG, MD 21010-5423

Technical Dir: Mr. Joseph J. Vervier

(410) 671-3838

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.905	NA	0.905
6.1 Other	4.032	1.059	5.091
6.2 IED (Navy)	NA	NA	NA
6.2 Other	21.167	19.624	40.791
6.3	1.862	0.729	2.591
<b>Subtotal (S&amp;T)</b>	<b>27.966</b>	<b>21.412</b>	<b>49.378</b>
6.4	42.286	23.374	65.660
6.5	14.778	44.599	59.377
6.6	0.687	3.270	3.957
6.7	0.810	0.150	0.960
Non-DOD	1.075	0.056	1.131
<b>TOTAL RDT&amp;E</b>	<b>87.602</b>	<b>92.861</b>	<b>180.463</b>
Procurement	16.774	66.814	83.588
Operations & Maintenance	12.492	1.534	14.026
Other	5.241	0.948	6.189
<b>TOTAL FUNDING</b>	<b>122.109</b>	<b>162.157</b>	<b>284.266</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

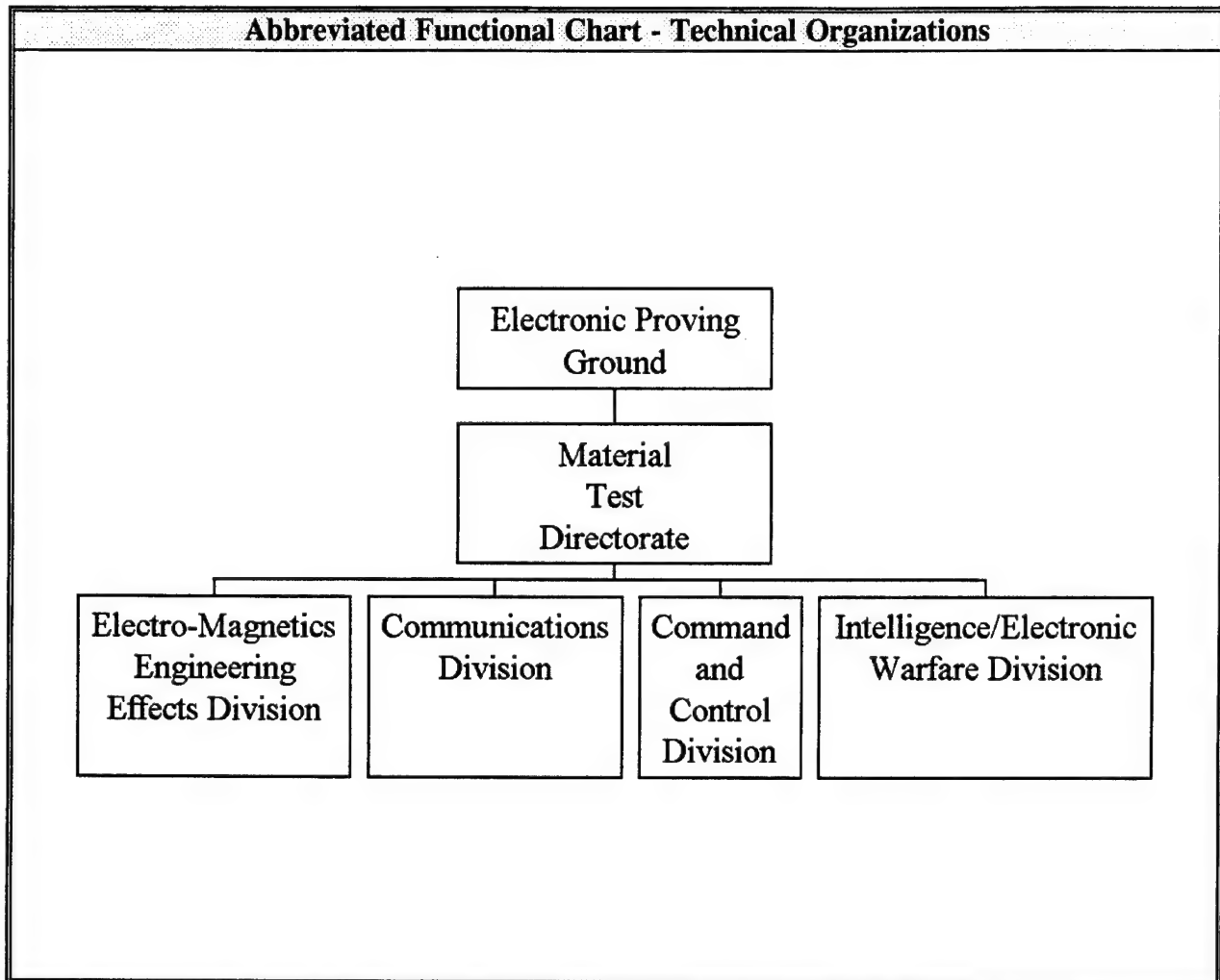
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	23	3	14	6
CIVILIAN	1,101	77	552	472
<b>TOTAL</b>	<b>1,124</b>	<b>80</b>	<b>566</b>	<b>478</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	936.000	<b>REAL PROPERTY</b>	70.100
ADMIN	216.000	* NEW CAPITAL EQUIPMENT	1.000
OTHER	310.000	<b>EQUIPMENT</b>	124.100
<b>TOTAL</b>	<b>1,462.000</b>	* NEW SCIENTIFIC & ENG. EQUIP.	21.000
ACRES	0	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Electronic Proving Ground



**Electronic Proving Ground**

Fort Huachuca, AZ 85613-7110  
(602) 538-6891

Commander: COL Wayne L. Sittler  
Tech Director: Michael J. O'Connor

**MISSION**

USAEPG is the Army's principal center for testing tactical electronics systems. Soon to be a reporting element of White Sands Missile Range, EPG will continue to plan, conduct and report technical testing of assigned systems while maintaining extensive instrumentation, and test facilities at Fort Huachuca, AZ. As members of support PEO/PM acquisition teams, EPG test officers maintain a customer focus while assuring objective and responsible testing. EPG has developed an extensive array of automated instrumentation for testing distributed C3I systems. The instrumentation is being used extensively by technical and operational testers alike. Likewise, EPG develops and uses computer models to simulate system performance in intended environments.

**CURRENT IMPORTANT PROGRAMS**

Unmanned Aerial Vehicle (UAV)  
Army Tactical Command and Control System (ATCS)  
Enhanced Position Location Reporting Systems (EPLRS)  
Global Positioning System (GPS)  
All Sources Analysis System (ASAS)  
Single Channel Ground and Airborne Radio Systems (SINGARS)  
Intel and Electronic Warfare (IEWCS)  
Counter Technology Assessment Center Support to Office of National Drug Control Policy (Cactus Wren)

**EQUIPMENT/FACILITIES**

Conducts integrated system testing. Operate electromagnetic environment test facility using computer modeling/simulation, hardware-in-the-loop and controlled field test environment. Facilities include: Instrumented test range. System interoperability computer software test facility. Realistic battlefield FM environment facility. Antenna test measurement. Outdoor compact range. EMI/EMC/Tempest. Transverse electromagnetic/reverberation chamber. Test item stimulators. Auto instrumentation and instrumented test range. Computer aided drafting. Environmental test facility using latest MIL-STD-461D RAM supportability and manprint design qualifications. Access to extensive real estate and extended air space. 12,000 foot paved runway. Paved and unpaved UAV runways.

**Electronic Proving Ground**

Fort Huachuca, AZ 85613-7110  
(602) 538-6891

Commander: COL Wayne L. Sittler  
Tech Director: Michael J. O'Connor

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.000	0.000	0.000
6.3	0.360	1.901	2.261
<b>Subtotal (S&amp;T)</b>	<b>0.360</b>	<b>1.901</b>	<b>2.261</b>
6.4	5.402	4.284	9.686
6.5	0.000	0.000	0.000
6.6	5.962	4.544	10.506
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>11.724</b>	<b>10.729</b>	<b>22.453</b>
Procurement	1.112	2.664	3.776
Operations & Maintenance	0.507	2.136	2.643
Other	10.542	5.986	16.528
<b>TOTAL FUNDING</b>	<b>23.885</b>	<b>21.515</b>	<b>45.400</b>

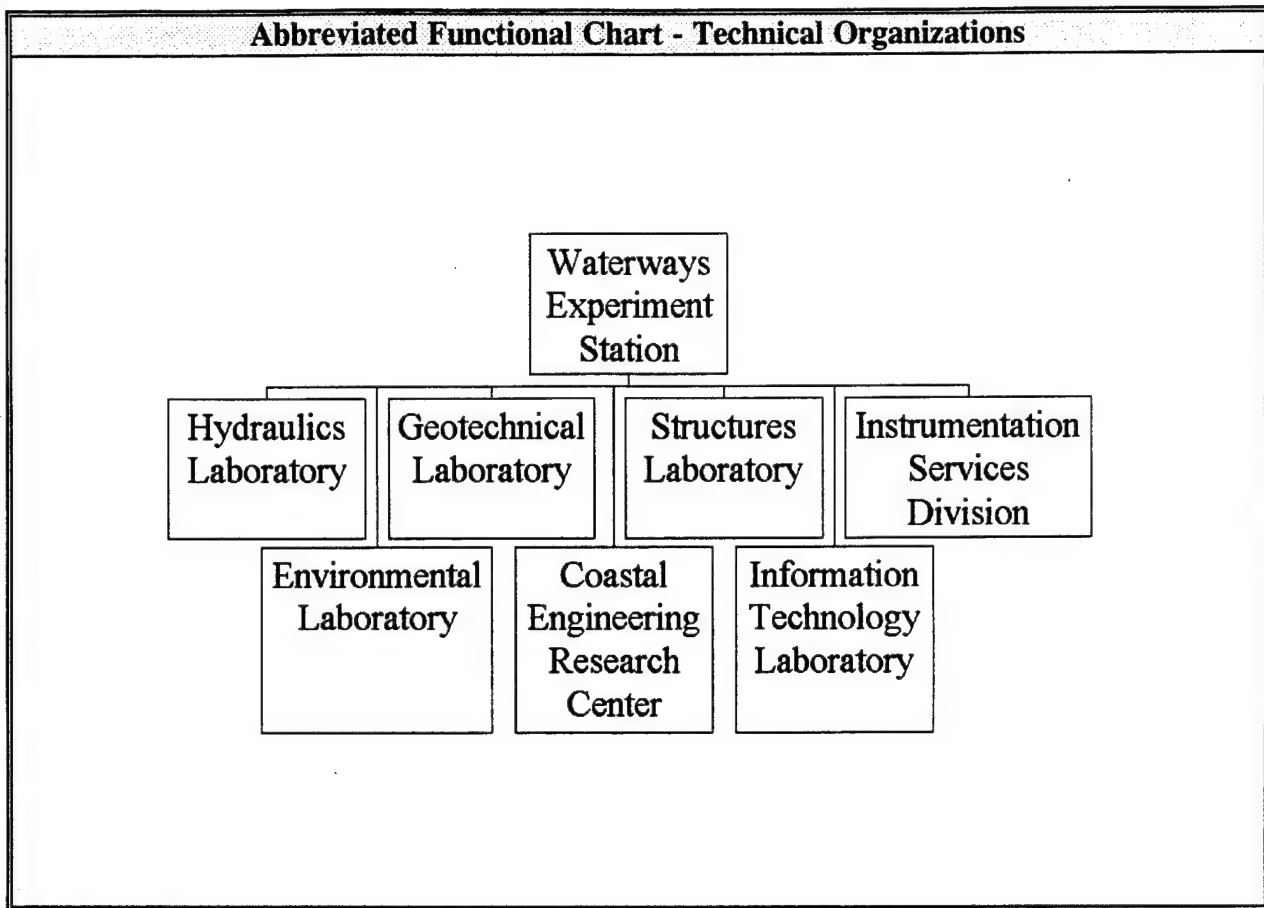
MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	294	1	22	271
CIVILIAN	150	2	70	78
<b>TOTAL</b>	<b>444</b>	<b>3</b>	<b>92</b>	<b>349</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	273.000	<b>REAL PROPERTY</b>	44.198
ADMIN	14.680	* NEW CAPITAL EQUIPMENT	0.000
OTHER	14.480	<b>EQUIPMENT</b>	135.701
<b>TOTAL</b>	<b>302.160</b>	* NEW SCIENTIFIC & ENG. EQUIP.	2.350
<b>ACRES</b>	<b>29,139</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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**Engineer Waterways Experiment Station**

**Engineer Waterways Experiment Station**

Vicksburg, MS 39180-6199  
(601) 634-2664

Director: Dr. Robert W. Whalin  
Commander: COL Bruce K. Howard

**MISSION**

The US Army Engineer Waterways Experiment Station (WES) is the largest Civil Engineering/Environmental Quality R&D Complex in DoD and is the Tri-Service Category 3 Reliance lead Laboratory in the Civil Engineering subareas of Airfields and Pavements, Sustainment Engineering, and Survivability and Protective Structures. WES is the Tri-Service Reliance lead Laboratory in the Environmental Quality subarea of Installation Restoration and the executing agency for the Office of the Secretary of Defense Joint Camouflage, Concealment, and Deception (JCCD) Joint Testing and Evaluation program. WES operates and maintains the first DoD High Performance Computing Resource Center for the Director, Defense Research and Engineering. The Tri-Service Computer Aided Design Drafting and Geographic Information System Technology Center is managed, operated and maintained by WES. The Corps of Engineers Central Processing Center is operated and maintained for the purpose of processing management information systems information for about 60% of Corps offices worldwide. WES manages 5 DoD Information Analysis Centers (IAC): Coastal Engineering IAC, Concrete Technology IAC, Hydraulic Engineering IAC, and the Soil Mechanics IAC. WES manages and executes 85% of the Army Corps of Engineer Civil Works Research and Development Program in the areas of hydraulic, coastal, geotechnical, structural, and environmental engineering and in information technology. Primary research and development missions encompass weapons effects; fighting positions; terrorist threat protection; obstacle creation and reduction; fixed facility camouflage, concealment, and deception; vehicle/terrain interaction; military hydrology; lines of communications, construction, and repair; airfields and pavements; coastal engineering; hydraulic engineering; flood control and navigation; dynamic modeling and simulation; environmental impact and groundwater modeling; wetlands processes; environmental site characterization; ecosystem processes; reservoir, riverine, estuarine and coastal water quality; mobility analyses; seismic response of structures; earthquake engineering; dredging and dredged material disposal; natural resource management, concrete technology, structural dynamics, and geotechnical engineering.

**CURRENT IMPORTANT PROGRAMS**

Unparalleled synergism exists between the \$129 million US Army Civil Works Programs (listed as Non-DoD under FUNDING DATA) and other DoD Programs. Construction materials and methods for rapid establishment of in-theater transportation network required for force projection; designs, materials, and construction practices for battlefield, fixed facility, and forward base survivability against advanced conventional and terrorist weapons; techniques for rapid obstacle creation; obstacle planning software for inclusion in the Army Tactical Command and Control System; accurate and reliable PC-based mobility models for command and control systems, combat models and simulations, and virtual prototyping; methodologies to predict coastal effects on Logistics-Over-The-Shore operations; Airfields and Pavements Research for durable

**CURRENT IMPORTANT PROGRAMS**

and cost-efficient pavements for roads, airfields, and other operating surfaces; effective remediation of sites contaminated with explosive, organics, and heavy metals; methods for investigation, characterization and monitoring of potential hazardous waste sites; prediction of subsurface transport of contaminants in subsurface groundwater; effective chemical analysis techniques for accurate identification of suspected contaminants at DoD sites; execution of the DoD Joint Test and Evaluation for Camouflage, Concealment and Deception. National Wetlands Research Program; Dredging Research Program; Zebra Mussel Research Program; Repair, Evaluation, Maintenance and Rehabilitation Program; Aquatic Plant Control; Earthquake Engineering Research.

**EQUIPMENT/FACILITIES**

The US Army Engineer Waterways Experiment Station (WES) has an unparalleled combination of experimental and computational facilities for research in hydraulic, geotechnical, structural, environmental, and coastal engineering, and in information technology. Some of the more significant facilities are:

Hazardous Toxic Waste Research Center (HTWRC) (17,000 sq ft): Only DoD permitted (RCRA) facility to conduct large volume HTW research, test, and evaluations, for which EPA recognizes the HTWRC as the Nation's premier facility.

Fate and Effects R&D Center (30,000 sq ft): Complete experimental radioisotope, microbiology, toxicity, and instrumental laboratories for contaminant fate and effects on ecosystems.

DoD High Performance Computing Center (55,000 sq ft): Includes a Cray C90 and a Cray Y-MP which provide the most powerful scientific and engineering capability in DoD with 1,920 MegaWords of memory, 250 Gigabytes of high-speed disk, and 10 Terabytes of high-speed robotic archival storage.

Airfields & Pavements Research Center (25,000 sq ft): State-of-the-art facility contains the DoD unique Joint Sealant Laboratory and an Automated Data Acquisition System for acquiring rheological data on creep, strength, resilient moduli, and fatigue of a variety of paving materials.

Soils Research Center (10,000 sq ft): The largest soils mechanics research facility in DoD, it has a loading capability of 250,000 lb on triaxial specimens up to 15 in. in diameter.

Mass Construction Materials Laboratory (20,000 sq ft): A concrete testing facility with load capacity of 2,500,000 lb for determining physical, chemical, and mineralogical properties of concrete pavement.

Full-Scale Aircraft Loading Facility: Simulates aircraft loading with different wheel loads and gear geometry applied to full-scale constructed test pavements; response and performance data for development of new design models and behavior theories; current fighter and transport aircraft simulators.

**Engineer Waterways Experiment Station****EQUIPMENT/FACILITIES (Continued)**

**Projectile Penetration Facility:** Unique to DoD, this facility enables investigation of anti-penetration shielding techniques employing geologic and manmade structural materials against a wide variety of projectile threats.

**Three-Dimensional Coastal Facilities:** Over 175,000 sq ft under roof for construction of 3-D hydraulic models. Contains over 300 ft of spectral wave generators including the 80-ft long Unidirectional Spectral Wave Generator designed to reproduce waves up to 2 ft in height.

**Field Research Facility, Duck, NC (175 acres):** Recognized worldwide for facilities for cooperative field experiments in coastal and nearshore processes.

**Riprap Test Facility:** The largest curved channel test facility of its kind, used for study of effects of curves on velocity of flow, specifically aimed at developing design criteria for riprap protection.

**Scientific Visualization Center:** Provides a \$4.1 million computer graphics laboratory to identify and develop innovative methods of interpreting large data sets from modeling/simulation, field data collection, and Computer Aided Design and Drafting (CADD) applications.

**Engineer Waterways Experiment Station**

Vicksburg, MS 39180-6199

(601) 634-2664

Director: Dr. Robert W. Whalin

Commander: COL Bruce K. Howard

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.253	NA	0.253
6.1 Other	2.330	0.740	3.070
6.2 IED (Navy)	NA	NA	NA
6.2 Other	82.460	44.612	127.072
6.3	18.449	7.922	26.371
<b>Subtotal (S&amp;T)</b>	<b>103.492</b>	<b>53.274</b>	<b>156.766</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	5.736	0.596	6.332
6.7	0.000	0.000	0.000
Non-DOD	92.323	37.289	129.612
<b>TOTAL RDT&amp;E</b>	<b>201.551</b>	<b>91.159</b>	<b>292.710</b>
Procurement	12.478	0.000	12.478
Operations & Maintenance	2.343	0.000	2.343
Other	0.010	0.000	0.010
<b>TOTAL FUNDING</b>	<b>216.382</b>	<b>91.159</b>	<b>307.541</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.010

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	5	1	4	0
CIVILIAN	1,529	185	537	807
<b>TOTAL</b>	<b>1,534</b>	<b>186</b>	<b>541</b>	<b>807</b>

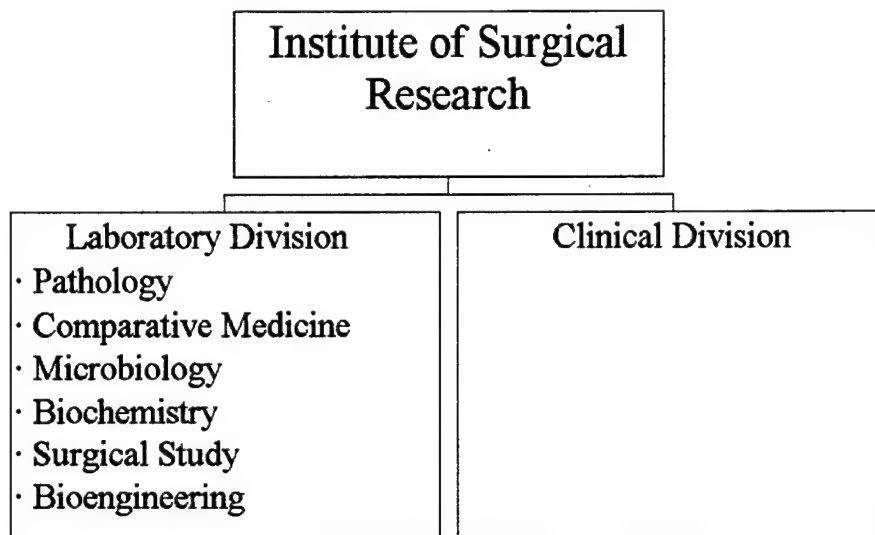
SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	2,505.940	<b>REAL PROPERTY</b>	466.960
ADMIN	193.851	* NEW CAPITAL EQUIPMENT	3.400
OTHER	63.730	<b>EQUIPMENT</b>	426.000
<b>TOTAL</b>	<b>2,763.521</b>	* NEW SCIENTIFIC & ENG. EQUIP.	19.161
<b>ACRES</b>	<b>2,705</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Institute of Surgical Research

Abbreviated Functional Chart - Technical Organizations



**Institute of Surgical Research**  
Fort Sam Houston, TX 78234-5012  
(210) 221-2720

Commander: COL Basil Pruitt Jr  
Executive Office: MAJ Richard J. Jocz

#### **MISSION**

Investigate problems of mechanical and thermal injuries with complications arising from such trauma; care for patients with such injuries; teach and train other personnel in the management of injured patients; conduct investigative studies at both the basic and clinical levels.

#### **CURRENT IMPORTANT PROGRAMS**

The most important ongoing program is the Clinical Operations Protocol which supports the care of burn patients. This protocol provides a foundation for other clinical and laboratory research protocols that investigate the pathophysiology of trauma caused by burns and their complications. The integration of the Military Trauma Research (MTR) program will increase this Institute's influence in the study of all types of trauma.

#### **EQUIPMENT/FACILITIES**

The Institute has an equipment hand receipt valued at \$12,000,000. The Institute consists of buildings totaling 62,000 square feet. This includes almost 17,000 square feet to support the 40-bed Burn Center located within Brooke Army Medical Center and 18,000 square feet to house the MTR Program.

## Institute of Surgical Research

Fort Sam Houston, TX 78234-5012

(210) 221-2720

Commander: COL Basil Pruitt Jr

Executive Office: MAJ Richard J. Jocz

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.191	NA	0.191
6.1 Other	1.857	0.000	1.857
6.2 IED (Navy)	NA	NA	NA
6.2 Other	6.369	0.000	6.369
6.3	0.191	0.000	0.191
<b>Subtotal (S&amp;T)</b>	<b>8.608</b>	<b>0.000</b>	<b>8.608</b>
6.4	0.000	0.000	0.000
6.5	1.034	0.000	1.034
6.6	0.000	0.000	0.000
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>9.642</b>	<b>0.000</b>	<b>9.642</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.000	0.000	0.000
Other	6.417	0.000	6.417
<b>TOTAL FUNDING</b>	<b>16.059</b>	<b>0.000</b>	<b>16.059</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

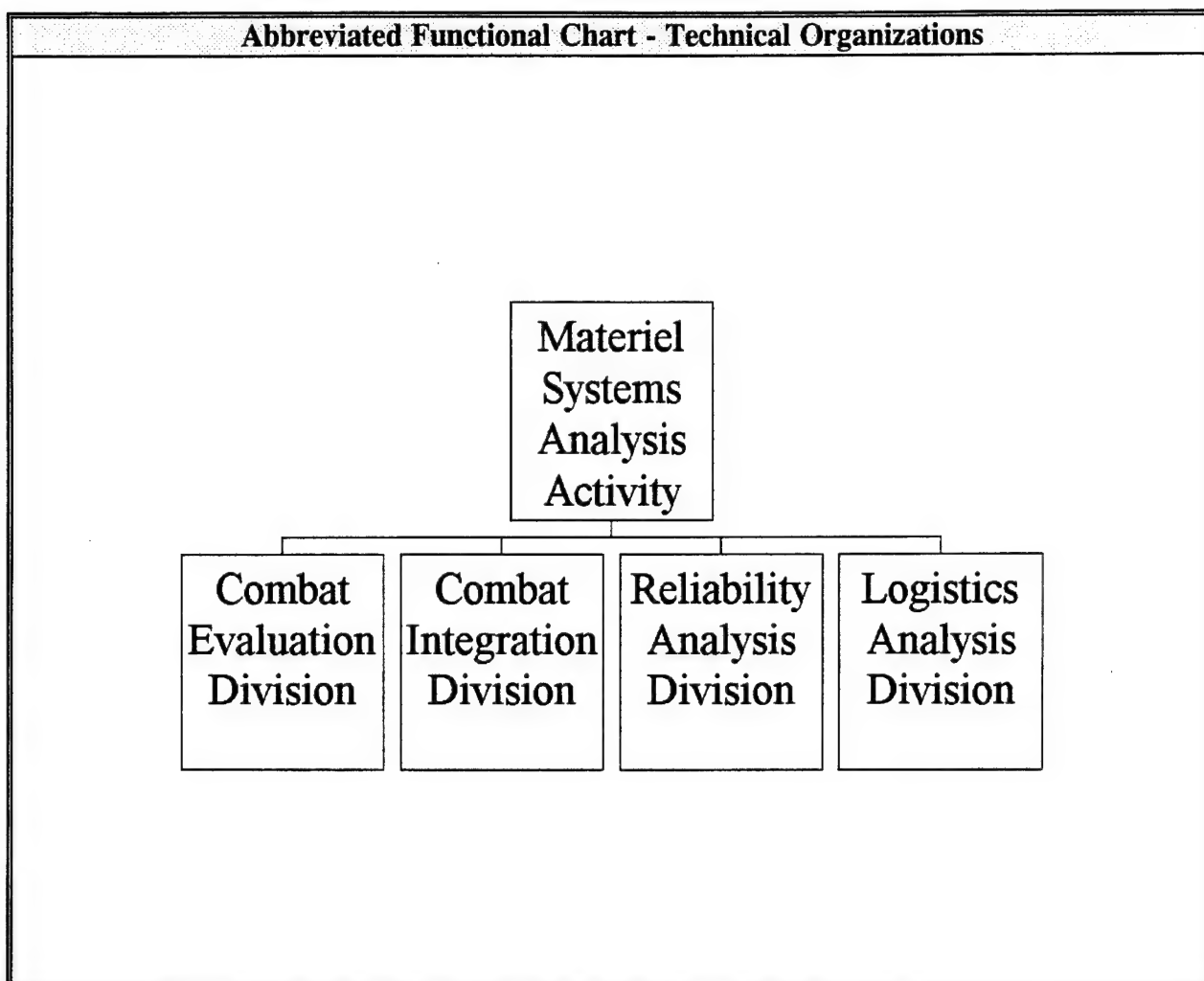
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	200	22	9	169
CIVILIAN	55	6	17	32
<b>TOTAL</b>	<b>255</b>	<b>28</b>	<b>26</b>	<b>201</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	39.000	<b>REAL PROPERTY</b>	0.000
ADMIN	6.000	* NEW CAPITAL EQUIPMENT	0.000
OTHER	17.000	<b>EQUIPMENT</b>	12.000
<b>TOTAL</b>	<b>62.000</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.400
<b>ACRES</b>	<b>0</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## Materiel Systems Analysis Activity



**Materiel Systems Analysis Activity**

Aberdeen Proving Gnd, MD 21005-5071  
(410) 278-6614

Director: Mr. John J. McCarthy  
Deputy Director: COL David C. Fountain

**MISSION**

Provide analysis for the Army to support the decision-making process.

**CURRENT IMPORTANT PROGRAMS**

Test design, independent evaluation and materiel systems analyses for systems such as: M1A2 Abrams; PATRIOT PAC-3; Comanche, Theater High Altitude Air Defense System; Armored Gun System; Longbow; Enhanced Position Location and Reporting System; Family of Medium Tactical Vehicles; Combat Service Support Control System; Advanced Field Artillery System/Future Armored Resupply Vehicle; Javelin; Army Tactical Missile System/Brilliant Antitank Munitions; Army Tactical Command and Control Systems; All Source Analysis System; 155mm Sense and Destroy Armor.

**EQUIPMENT/FACILITIES**

Tactical simulation facility for processing classified material. Simulation/simulator laboratory used for experimental development and validation of models and simulations. Additional equipment for use in: materiel systems analysis; item level performance analysis; weapon system effective estimates for cost and operational effectiveness analysis; technical and live fire test design; independent technical evaluation of major and designated non-major systems; methodology and computer simulation development; system life cycle surveillance and overview; primary source of technical data for major Army studies; general systems analysis for development of decision information; independent integrated logistical support evaluations for determination of Army staff positions; field exercise and sample data collection; inventory modeling; general logistics, provisioning, support and readiness analysis; and coordination of joint munitions effectiveness methodology and data (joint technical coordinating group).

**Materiel Systems Analysis Activity**  
 Aberdeen Proving Gnd, MD 21005-5071  
 (410) 278-6614

Director: Mr. John J. McCarthy  
 Deputy Director: COL David C. Fountain

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.000	0.000	0.000
6.3	0.000	0.000	0.000
<b>Subtotal (S&amp;T)</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	21.919	10.115	32.034
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>21.919</b>	<b>10.115</b>	<b>32.034</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	4.940	0.684	5.624
Other	2.005	1.614	3.619
<b>TOTAL FUNDING</b>	<b>28.864</b>	<b>12.413</b>	<b>41.277</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

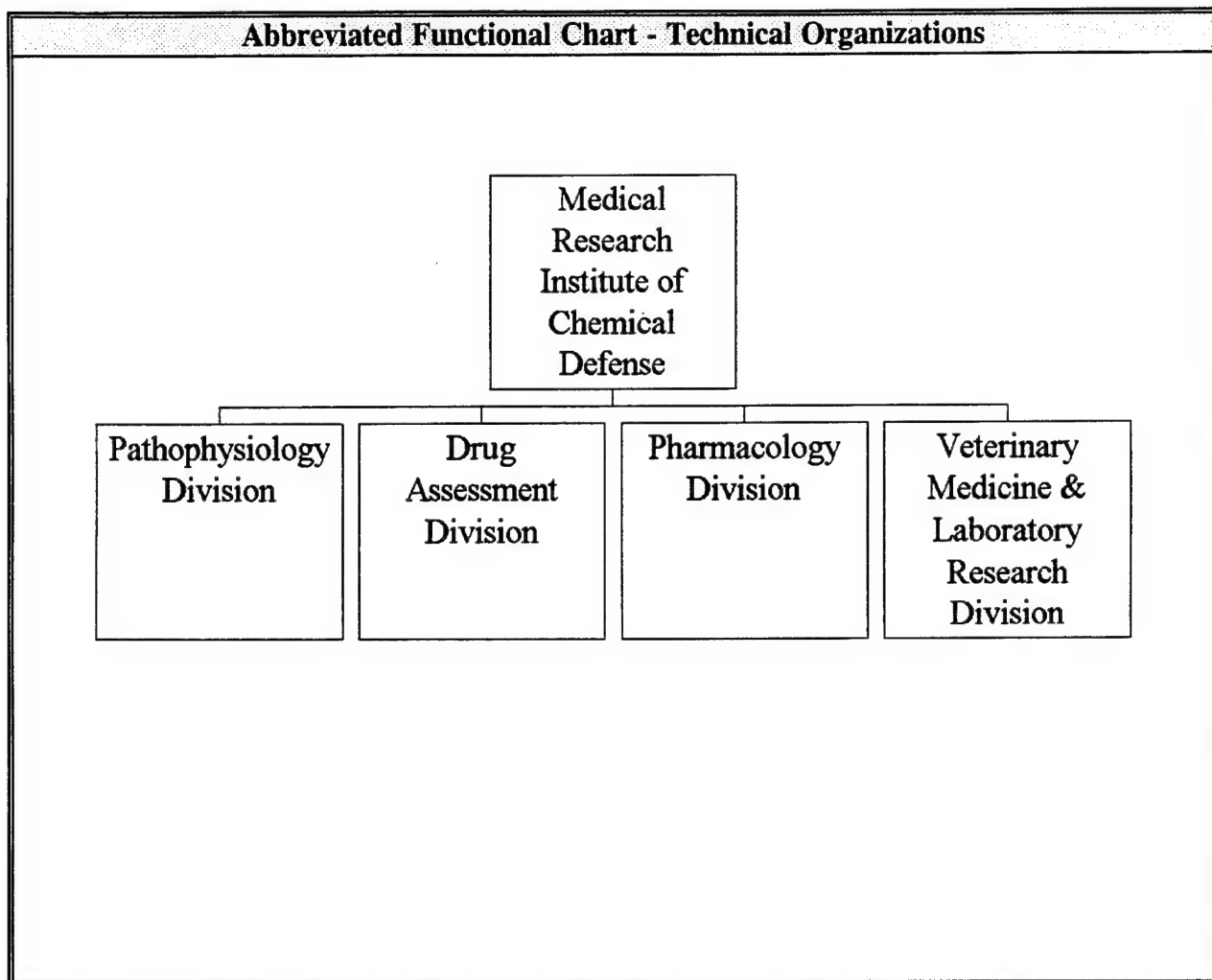
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	23	0	15	8
CIVILIAN	414	12	304	98
<b>TOTAL</b>	<b>437</b>	<b>12</b>	<b>319</b>	<b>106</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	1.600	<b>REAL PROPERTY</b>	3.596
ADMIN	126.350	* NEW CAPITAL EQUIPMENT	0.000
OTHER	6.050	<b>EQUIPMENT</b>	8.499
<b>TOTAL</b>	<b>134.000</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>4</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## Medical Research Institute of Chemical Defense



**Medical Research Institute of Chemical Defense**

Aberdeen Proving Gr, MD 21010-5425

(410) 671-3276

Commander: COL Charles G. Hurst

Deputy Cdr: COL James S. Little

**MISSION**

The U.S. Army Medical Research Institute of Chemical Defense is the U.S. Army Medical Research and Materiel Command's lead laboratory responsible for conduct of research as it relates to medical defense against chemical warfare (CW). This mission includes: fundamental and applied research on mechanisms of action of CW threat agents, candidate pretreatment, treatment, and personal or skin decontamination compounds in order to establish a scientific and technical base from which to plan and formulate enhanced medical countermeasures to CW threats and improved prevention and treatment modalities for CW casualties; test and evaluation of drugs, decontaminants, and medical equipment in development for the prevention, resuscitation, treatment, and management of chemical casualties; assistance in the integration of the concepts and products from these research, development, test, and evaluation mission activities into the logistical system, doctrine and organizational development, and training; and training of both medical and non-medical personnel in the prevention and management of chemical casualties. In addition, the Institute has the mission to conduct research on medical defense against low molecular weight toxins.

**CURRENT IMPORTANT PROGRAMS**

Basic research on medical countermeasures for chemical warfare (CW) and neurotoxin agents; biomedical effects of CW agents and candidate medical countermeasures; safety and efficacy of candidate preventive countermeasures; analytical technology for medical countermeasures; and advanced studies of casualty care technology. By FY96, exploit pathophysiological database and new technologies for prophylaxis, pretreatment, and/or antidote strategies which will provide significant protection against vesicant injury. Demonstrate by FY00, safety and efficacy of a candidate medical countermeasure sufficient for a Milestone O transition. Demonstrate by FY94, the safety and efficacy of a methemoglobin form for pretreatment against cyanide. During FY94 through FY99, exploit novel pharmacological, biotechnological, and molecular biological techniques to develop cyanide pretreatment/therapeutic strategies that protect against predicted battlefield concentrations of cyanide without operationally significant side effects or decrements in soldier performance. Demonstrate by FY02, safety and efficacy for a Milestone O transition of new nontoxic antidote and/or pretreatment compounds. Demonstrate by FY97, safety and efficacy sufficient for a Milestone O transition of the technology for an advanced anticonvulsant adjunct or component for the soldier/buddy-use nerve agent antidote. Advanced anticonvulsant will overcome deficiencies of current anticonvulsant (i.e., will be more effective in stopping on-going convulsive seizures, preventing their reoccurrence, and in protecting against nerve agent-induced, seizure-related brain damage). It will also demonstrate less abuse potential than the currently fielded anticonvulsant. By FY94, establish the feasibility of using a biological scavenger as a pretreatment to reduce in vivo toxicity of a chemical agent. During FY94 through FY99, develop chemical agent countermeasures that provide protection against predicted battlefield concentrations of CW agents without operationally significant physiological or psychological side effects. Demonstrate by FY99, safety and efficacy sufficient for a Milestone O transition of the technology for a topical skin protectant that will provide protection against penetration and will detoxify both vesicant and nerve CW agents. By FY02, transition an advanced skin/wound decontamination system that will be both safe and efficacious for decontaminating chemically contaminated conventional wounds. Develop a pathophysiology database on respiratory agents by FY95. Exploit these data prior to FY97 for definitive medical care and treatment strategies.

**Medical Research Institute of Chemical Defense****EQUIPMENT/FACILITIES**

Chemical casualty care training, physiology, drug assessment, pathophysiology, pharmacology, analytical chemistry, neurotoxicology, veterinary surgery, chemical safety/surety, medical maintenance, information and resource management, supply and quality assurance. Technical library with 6,000 books, 1,000 journal titles, and many databases. Video facility, computer facility and 7,000 Sq. Ft. animal facility. Radioisotope chemical antidote and biochemical analysis, histochemistry, behavioral testing, drug screening, pharmacokinetics, molecular modeling, liquid, gas, column and affinity chromatography, quantitative image enhancement/analysis, electrophoresis, spectroscopy, fluorometry and spectropolarimetry, GC mass spectrometry, electron spin resonance and peptide synthesis/sequencing, amino acid analysis, monoclonal hapten antibodies; electron, scanning and X-ray microscopy, cell cloning, receptor analysis.

**Major Facilities and Equipment:**

**Building E-3100:** Main Medical Chemical Defense Research Laboratory and Administrative Building

**Building E-3081:** Unique to DOD. Contains a Chemical Surety Materiel Laboratory for Medical Chemical Defense Research

**Building E-3156:** Large Animal Holding/Chemical Research Facility

**Building E-3244:** Biotoxin Research Facility

**Building E-3103/E-3106:** Chemical Casualty Care Training Facility

**Building E-3103/Classroom:** Chemical portion of the Management of Chemical and Biological Casualties Course (6H-F26) is conducted here.

**Building E-3101:** Administrative Facility: Surety, Safety, Environment, and Contract Management

**Hazardous Materiel Storage and 90-Day Hazardous Waste Sites:** These sites meet stringent specifications which conform to the environmental requirements for the storage and disposition of chemicals and hazardous materials.

**Building E-3105:** Information Management Support Facility

**Building E-3107:** Toxic Materiel Turn-in Facility

**Building E-3104:** Environmentally Controlled Building for Electronic Equipment

**Building E-2180:** Equipment Storage and Turn-in Facility

**EQUIPMENT/FACILITIES**

Building E-5179: Audio-visual Storage Facility

Building E-5244: Environmentally Controlled Tape and Electronic Storage Facility

Building E-5826: Animal Care Equipment Storage Facility

Building E-3221: Turn-in Facility

Direct Digital Control HVAC System: System provides constant control and 24-hour remote monitoring of chemical fume hoods in the Surety Area of building E-3081, controls HVAC throughout remainder of laboratories and administrative areas, and controls and remotely monitors all animal rooms in buildings E-3081, E-3100, E-3156, and E-3244.

Walk-in Coolers: Storage of chemicals used for research.

Chillers, Building E-3081: Installed in 1994 to meet EPA requirements. Each unit produces 350 tons of cooling using 123 refrigerant.

Chillers, Building E-3100: Installed in 1994 to meet EPA requirements. Each unit produces 350 tons of cooling using 123 refrigerant.

Medical Waste Incinerator: Required to burn animal bedding, carcasses, and medical waste generated by the Institute.

Air Compressor: Required to supply laboratories with bench air for research.

Chemical/Biological/Radiological (CBR) Filter Trains: Provided for all 77 chemical/biological hoods located in buildings E-3100, E-3081, and E-3244. Each CBR filter train consists of a housing unit containing prefilter, as well as the appropriate number and size of High Efficiency Particulate (HEPA) and High-Efficiency Gas-Phase Absorber (HEGA) filters. All filter trains are in support of the Chemical/Biological Defense Program and are in compliance with Environmental Protection Agency, State, and Federal Standards.

Exterior Walk-in: Storage of animal carcasses prior to incineration.

Auxiliary Chillers: Provides renovated laboratories with additional cooling to support electronic equipment.

Building E-3106: Chemical Casualty Care Training Facility Exterior

Decontamination Showers Required to conduct research in accordance with regulations.

Building E-3156/Associated Animal Pens: Required for the care of animals used in research.

**Medical Research Institute of Chemical Defense****EQUIPMENT/FACILITIES**

**Building E-3156 Animal Room:** Required for the care of animals used in research.

**House Water Distillation System:** This central system feeds water to satellite polishing systems in the individual laboratories. Pure laboratory water is needed in virtually all segments of laboratory research. High-purity water is used for reagent buffers and sensitive instrumental analyses (such as High Pressure Liquid Chromatograph, Gas Chromatograph/Mass Spectrometer, as well as in washing and/or preparing biological solutions such as media for tissue culture.

**Hazardous Materiel and 90-Day Hazardous Waste Sites:** These sites meet stringent specifications which conform to the environmental requirements for the storage and disposition of chemicals and hazardous materials.

**Building E-3100 Emergency Generator:** Provides emergency power for lighting, freezers, incubators, and other specialized equipment which must remain operational.

**Administrative and Laboratory Emergency Generator:** Provides emergency power for lighting, freezers, incubators, and other equipment which must remain operational.

**Surety Area Back-up Generator:** Supplies emergency power to the entire chemical surety wing to include all fume hoods, heating, ventilation and air conditioning systems, and electrical systems.

**Uninterruptable Power System (UPS):** System supplies immediate power to the fume hood exhaust blowers in the chemical surety area until the emergency generator starts and transfers power.

**Surety Area Holding Tanks:** Consists of two 10,000 gallon tanks which hold all waste water generated in the surety wing. This ensures that chemical spills will not escape into the sanitary sewer.

## Medical Research Institute of Chemical Defense

Aberdeen Proving Gr, MD 21010-5425

(410) 671-3276

Commander: COL Charles G. Hurst

Deputy Cdr: COL James S. Little

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.088	NA	0.088
6.1 Other	3.996	0.045	4.041
6.2 IED (Navy)	NA	NA	NA
6.2 Other	9.381	0.105	9.486
6.3	2.130	0.025	2.155
<b>Subtotal (S&amp;T)</b>	<b>15.595</b>	<b>0.175</b>	<b>15.770</b>
6.4	0.166	0.000	0.166
6.5	0.012	0.000	0.012
6.6	0.000	0.000	0.000
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>15.773</b>	<b>0.175</b>	<b>15.948</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.396	0.000	0.396
Other	4.233	0.000	4.233
<b>TOTAL FUNDING</b>	<b>20.402</b>	<b>0.175</b>	<b>20.577</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

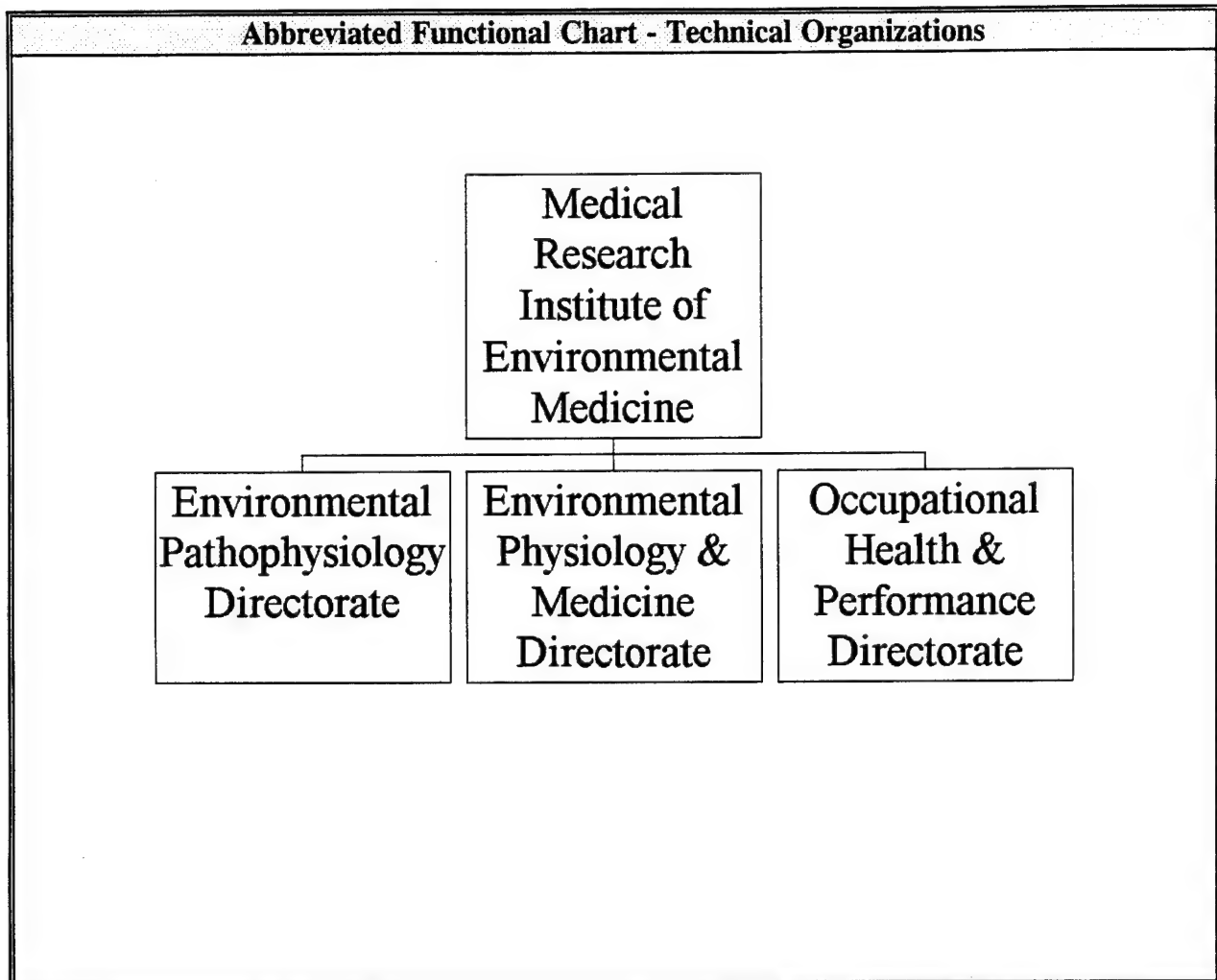
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	75	23	9	43
CIVILIAN	170	34	37	99
<b>TOTAL</b>	<b>245</b>	<b>57</b>	<b>46</b>	<b>142</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	37.419	<b>REAL PROPERTY</b>	23.400
ADMIN	38.433	* NEW CAPITAL EQUIPMENT	1.600
OTHER	123.100	<b>EQUIPMENT</b>	28.900
<b>TOTAL</b>	<b>198.952</b>	* NEW SCIENTIFIC & ENG. EQUIP.	1.600
<b>ACRES</b>	<b>30</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Medical Research Institute of Environmental Medicine



**Medical Research Institute of Environmental Medicine**

Natick, MA 01760-5007

(508) 651-4811

Commander: COL Joel T. Hiatt

Exec. Officer: MAJ Mary L. Ramos

**MISSION**

Conduct research to determine the effects of heat, cold, high terrestrial altitude, nutrition and work upon the soldiers life process, performance and health. Defense interaction of environmental stresses.

**CURRENT IMPORTANT PROGRAMS**

**Environmental Injury:** Demonstrate the efficacy of strategies to prevent and treat environmental illnesses, injuries and performance decrements.

**Performance Limits:** Develop and validate models to predict the effects of heat, cold, high altitude, hydration, nutritional status, and clothing and individual equipment on performance. **Nutritional Strategies:** Identify and demonstrate nutritional strategies to maintain health and soldier performance.

**Musculoskeletal Injuries and Physical Performance:** Demonstrate the efficacy of methods to reduce the incidence of musculoskeletal injuries and optimize performance during military training and operations. Special emphasis is being placed on Defense Women's Health Research.

**Medical Chemical Defense:** Investigate and define mechanism(s) of vesicant injury.

**EQUIPMENT/FACILITIES**

The major equipment and facility capabilities of the laboratory include, but are not limited to: two (2) large altitude chambers, fourteen (14) small climatic chambers, a new human psychology laboratory, and a new biomechanics laboratory, developed jointly with the U.S. Army Natick Research, Development and Engineering Center, American Association for Accreditation of Laboratory Animal Care (AAALAC) accredited animal care facilities, electron microscope, underwater research pool, copper manikins, and diverse pharmacological and psychological measuring equipment. The Institute maintains a field facilities on the summit of Pikes Peak, CO.

## Medical Research Institute of Environmental Medicine

Natick, MA 01760-5007

(508) 651-4811

Commander: COL Joel T. Hiatt

Exec. Officer: MAJ Mary L. Ramos

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.086	NA	0.086
6.1 Other	1.446	0.692	2.138
6.2 IED (Navy)	NA	NA	NA
6.2 Other	4.184	1.439	5.623
6.3	0.315	0.085	0.400
<b>Subtotal (S&amp;T)</b>	<b>6.031</b>	<b>2.216</b>	<b>8.247</b>
6.4	0.080	0.050	0.130
6.5	0.000	0.000	0.000
6.6	0.000	0.000	0.000
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>6.111</b>	<b>2.266</b>	<b>8.377</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.000	0.000	0.000
Other	4.369	0.248	4.617
<b>TOTAL FUNDING</b>	<b>10.480</b>	<b>2.514</b>	<b>12.994</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

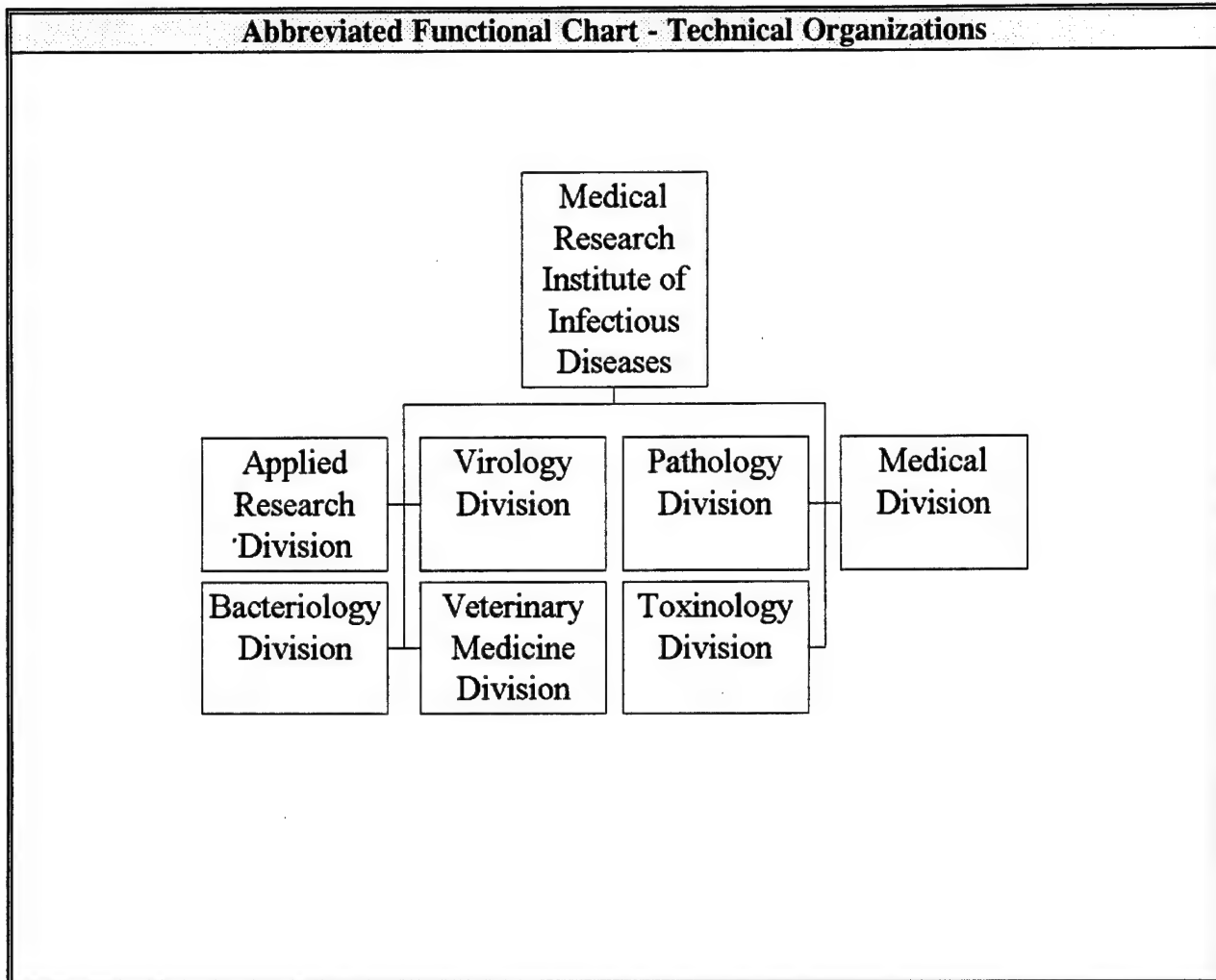
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	74	24	1	49
CIVILIAN	80	28	24	28
<b>TOTAL</b>	<b>154</b>	<b>52</b>	<b>25</b>	<b>77</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	47.634	<b>REAL PROPERTY</b>	25.505
ADMIN	7.060	* NEW CAPITAL EQUIPMENT	0.000
OTHER	33.875	<b>EQUIPMENT</b>	22.978
<b>TOTAL</b>	<b>88.569</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
ACRES	0	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Medical Research Institute of Infectious Diseases



**Medical Research Institute of Infectious Diseases**

Fort Detrick, MD 21702-5011

(301) 619-2833

Commander: COL Ernest T. Takafuji

Deputy Cdr: COL David R. Franz

**MISSION**

To conduct research to develop strategies, products, information and training for medical defense against biological warfare threats and against naturally occurring infectious agents of military importance that require special containment. The Institute is the lead laboratory in the Medical Biological Defense Research Program and participates in crucial aspects of the Infectious Disease Research Program.

**CURRENT IMPORTANT PROGRAMS**

Development of medical countermeasures for biological warfare threats continues to be the highest mission priority. New vaccine candidates for plague, anthrax, staphylococcal enterotoxin B, Venezuelan equine encephalitis, and botulinum toxin have been generated using genetic engineering approaches and are in various stages of advanced preclinical testing. A conventionally prepared vaccine for ricin is ready for advanced development. A recombinant vaccine for Korean hemorrhagic fever is in early clinical trials. Development of diagnostic kits for use in far forward field scenarios continues to receive top priority, with a systematic approach to standardizing assays and addressing significant biological warfare and infectious disease threats. Efforts to develop a genetically engineered vaccine for hantavirus have received additional attention because of the outbreak of new hantaviral disease in the southwestern United States. This laboratory has played a key scientific role in the assessment of this disease outbreak.

**EQUIPMENT/FACILITIES**

Three buildings provide 347,000 square feet with approximately 15% of the laboratory space capable of operations at biosafety level 3 and approximately 3% capable of operations at biosafety level 4 (maximum containment). These containment laboratories are a unique international resource for the safe study of high hazard disease agents, and are the only such laboratories within the DoD. Other unique facilities include: a 16-bed clinical research ward; high containment patient care facility and support functions; containment patient care facility and support functions; contained dynamic aerosol laboratory exposure systems; cell culture and hybridoma laboratory; electron microscopy and mass spectrometry equipment. The laboratory facilities also include a small farm for the care and housing of large animals used in research.

BLDG	Year Built
1221	1952 (42 yrs)
1259 (original)	1986 (8 yrs)
1259 (pens)	1992 (2 yrs)
1259 (addition)	1992 (2 yrs)
1412	1958 (36 yrs)
1425	1969 (25 yrs)
1425 (Admin Modules)	1986 (8 yrs)
1425 (records)	1991 (3 yrs)
1425 (chemical)	1991 (3 yrs)
1425 (warehouse)	1993 (1 yr)
1425 (2nd Fl Add)	1994
1414	1958 (36 yrs)
1656	1959 (35 yrs)
1258	1988 (6 yrs)

## Medical Research Institute of Infectious Diseases

Fort Detrick, MD 21702-5011

(301) 619-2833

Commander: COL Ernest T. Takafuji

Deputy Cdr: COL David R. Franz

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
RDT&E:			
6.1 ILIR	1.669	NA	1.669
6.1 Other	4.291	2.999	7.290
6.2 IED (Navy)	NA	NA	NA
6.2 Other	10.805	0.749	11.554
6.3	5.494	0.734	6.228
Subtotal (S&T)	22.259	4.482	26.741
6.4	0.360	0.000	0.360
6.5	0.138	0.000	0.138
6.6	0.000	0.000	0.000
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
TOTAL RDT&E	22.757	4.482	27.239
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.000	0.000	0.000
Other	13.476	0.000	13.476
TOTAL FUNDING	36.233	4.482	40.715

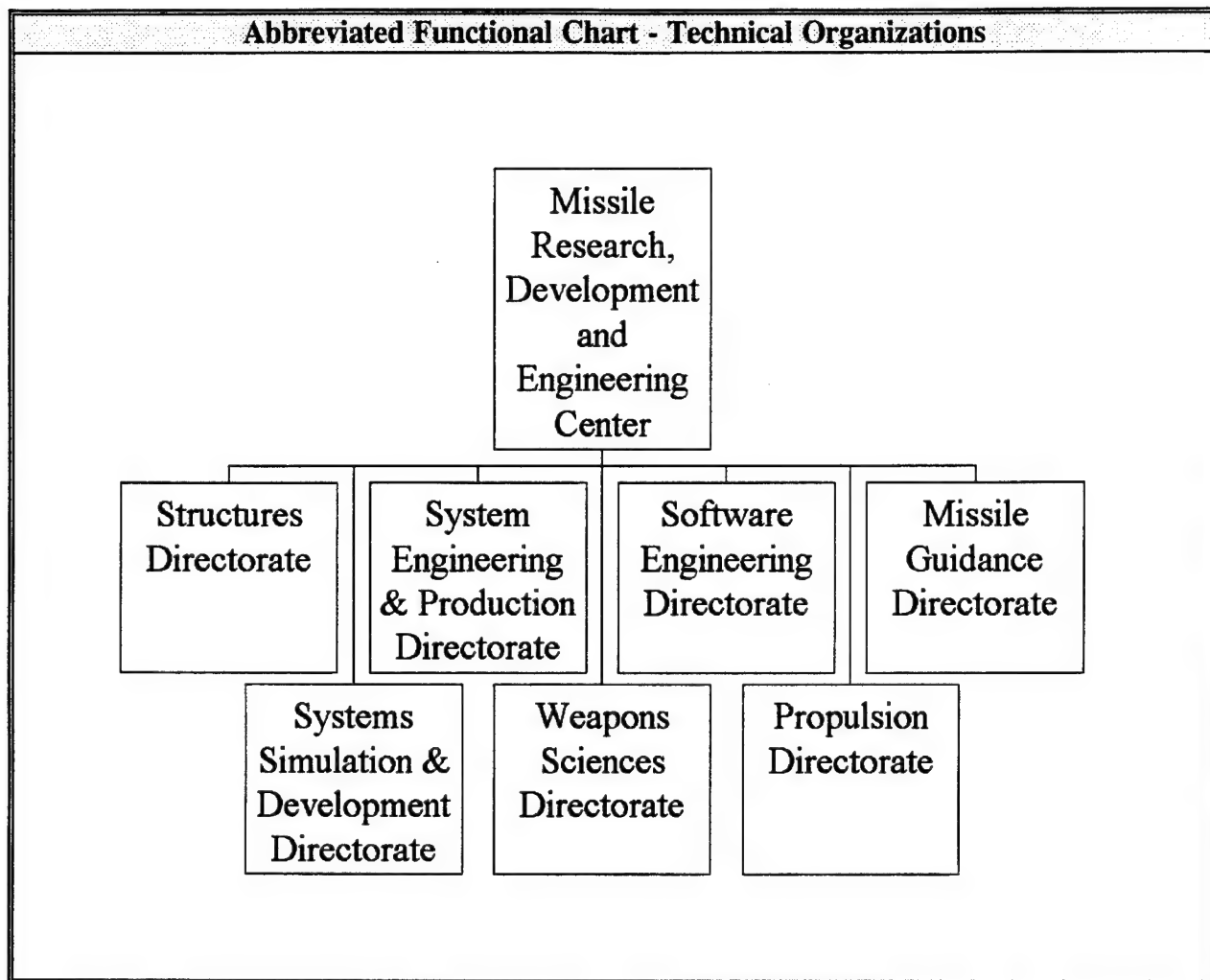
MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	296	37	11	248
CIVILIAN	236	48	35	153
TOTAL	532	85	46	401

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	121.000	REAL PROPERTY	23.962
ADMIN	78.000	* NEW CAPITAL EQUIPMENT	1.186
OTHER	148.000	EQUIPMENT	40.306
TOTAL	347.000	* NEW SCIENTIFIC & ENG. EQUIP.	1.571
ACRES	150	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

Missile Research, Development & Engineering Center



**Missile Research, Development & Engineering Center**

Redstone Arsenal, AL 35898-5241  
(205) 842-2201

Tech. Director: Dr. William C. McCorkle  
Deputy Director: Dr. Richard G. Rhoades

**MISSION**

**MISSION:** To plan, manage and conduct research, exploratory and advanced development for guided missile and rocket weapon systems and related components, devices and techniques. Perform research and component development, to generate new manufacturable technology, reduce development lead time and system cost, and improve reliability. Plan, establish and manage the MICOM programs to provide life cycle system engineering and production engineering, and execute management of computer resources embedded in battlefield automated systems. Provide full matrix scientific, engineering and technical support for all weapon system program life cycle phases, to Program Executive Offices, Project Managers, and other AMC and DOD elements having project or system management responsibility. Serve as AMC Lead Laboratory for Guidance and Control/Terminal Homing, High Energy Lasers, Missile Systems Simulation and Short Range Unmanned Aerial and Ground Vehicle systems. Interface with user and TRADOC to determine weapon system cognizance of current and future threats. The purpose of our national defense mission is two-fold. First, national defense is provided through advanced technology development for the Soldier. Second, we enhance the world competitiveness of U.S. companies by leveraging resources and sharing R&D cost with industry, to maximize dual-use applications of technology.

**VISION:** Weapon system technology for decisive victory without casualties.

**GOALS:**

1. Champion professionalism and stewardship of time, resources, and facilities.
2. Give intensive, persevering, and constructive support to all customers.
3. Conduct research, development, and engineering of exceptional value to the nation.
4. Champion new and revolutionary technologies for future Army systems.
5. Identify and improve all major processes to foster a work force of integrated competencies.
6. Develop a superior staff having technological stature recognized inside and outside the government.
7. Generate a quality of life to foster innovation and creativity.
8. Build trust and teamwork with our customers and suppliers.

**CURRENT IMPORTANT PROGRAMS**

Rapid Force Projection Initiative (RFPI)  
The Army Combined Arms Weapon System (TACAWS)  
Advanced Hypervelocity Missile  
Insensitive Munition for Missile Propulsion  
Optical Correlator Demonstration  
Ducted Rocket Engine

**EQUIPMENT/FACILITIES**

Propellant Mechanical Properties Facility - This is the most modern facility in DoD dedicated to solid rocket motor structural integrity and service life extension investigation. Completed in 1988, it meets DoD's latest safety requirements for handling hazardous propulsion materials.

Target and Seeker Measurement Facility (TSMF) - Used by the Army and Air Force for sensor/seeker design measurements, this facility includes a 300 foot tower and elevator combination allowing an operator access to equipment at any elevation up to the maximum. It also includes a 70 ton capacity target turntable with multiple degrees of freedom.

Advanced Simulation Facility - This facility is unequaled in the free world providing hardware-in-the-loop-simulation across the electromagnetic spectrum. It enjoys an international reputation with the countries of France, Britain, Germany, Belgium, and Israel.

Guidance and Control Analysis Facility - An all digital facility for check out of flight systems, this capability is unprecedented in its system bandwidth. It is currently used for real time check out of extremely high bandwidth ADKEM guidance and control components.

Anechoic RF Test Chamber - This facility is world renowned for its wide anechoic bandwidth and physical size. A specially designed floor provides realistic simulation of surface wave propagation - a unique capability.

Fire Support System Integration Lab - Designed for end to end weapon system hardware check out, this facility contains distributed, netted communication nodes which can perform high and low level system tests. The facility is currently uniquely configured to check out the MLRS family of munitions.

Army Missile Optical Range - A one of a kind, very large aperture (2m) compact laser range capable of illuminating large targets, under simulated far field conditions, at short range. This facility is used extensively for measurement of Strategic Defense Targets.

**EQUIPMENT/FACILITIES**

UAV System Integration Laboratory - A world class facility unique in its ability to integrate multiple UAV systems and test common subsystem integration interfaces.

Air Defense Interoperability Test Facility - Designed for weapon system software check out, this is the only facility in the U.S. Government having, in residence, all Army deployed tactical air defense systems (Patriot, AN/TSQ-73, HAWK with radars) and regularly conducts inter-Service and intra-Army testing.

Composites Manufacturing Facility - Wholly Government owned and operated, the Composites Manufacturing Facility provides MRDEC engineers with a "hands on" capability in missile composites manufacturing from project concept, through fabrication, and testing. This facility is the Government's principal repository of technical expertise in this area.

Propellant Signature Characterization Facility - This environmentally controlled "smoke tunnel" is used by all Services to evaluate contractor propellants and conduct detailed analysis of propellant insensitive munition properties.

Automated Manufacturing Cells - Contains a uniquely automated, fiberoptic winding capability and a cell for automated inspection of printed circuit boards down to 1-2 mils line width.

Laser Induced Chemistry Facility - Unique facility which includes lasers covering ultraviolet to infrared and analytical instrumentation to identify compounds resulting from laser induced reactions.

**Missile Research, Development & Engineering Center**

Redstone Arsenal, AL 35898-5241  
(205) 842-2201

Tech. Director: Dr. William C. McCorkle  
Deputy Director: Dr. Richard G. Rhoades

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.500	NA	0.500
6.1 Other	1.944	0.729	2.673
6.2 IED (Navy)	NA	NA	NA
6.2 Other	9.546	18.899	28.445
6.3	13.424	41.723	55.147
<b>Subtotal (S&amp;T)</b>	<b>25.414</b>	<b>61.351</b>	<b>86.765</b>
6.4	32.983	50.864	83.847
6.5	5.637	21.835	27.472
6.6	1.570	0.723	2.293
6.7	3.215	13.966	17.181
Non-DOD	0.066	0.079	0.145
<b>TOTAL RDT&amp;E</b>	<b>68.885</b>	<b>148.818</b>	<b>217.703</b>
Procurement	24.575	40.854	65.429
Operations & Maintenance	9.940	14.373	24.313
Other	13.240	105.296	118.536
<b>TOTAL FUNDING</b>	<b>116.640</b>	<b>309.341</b>	<b>425.981</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

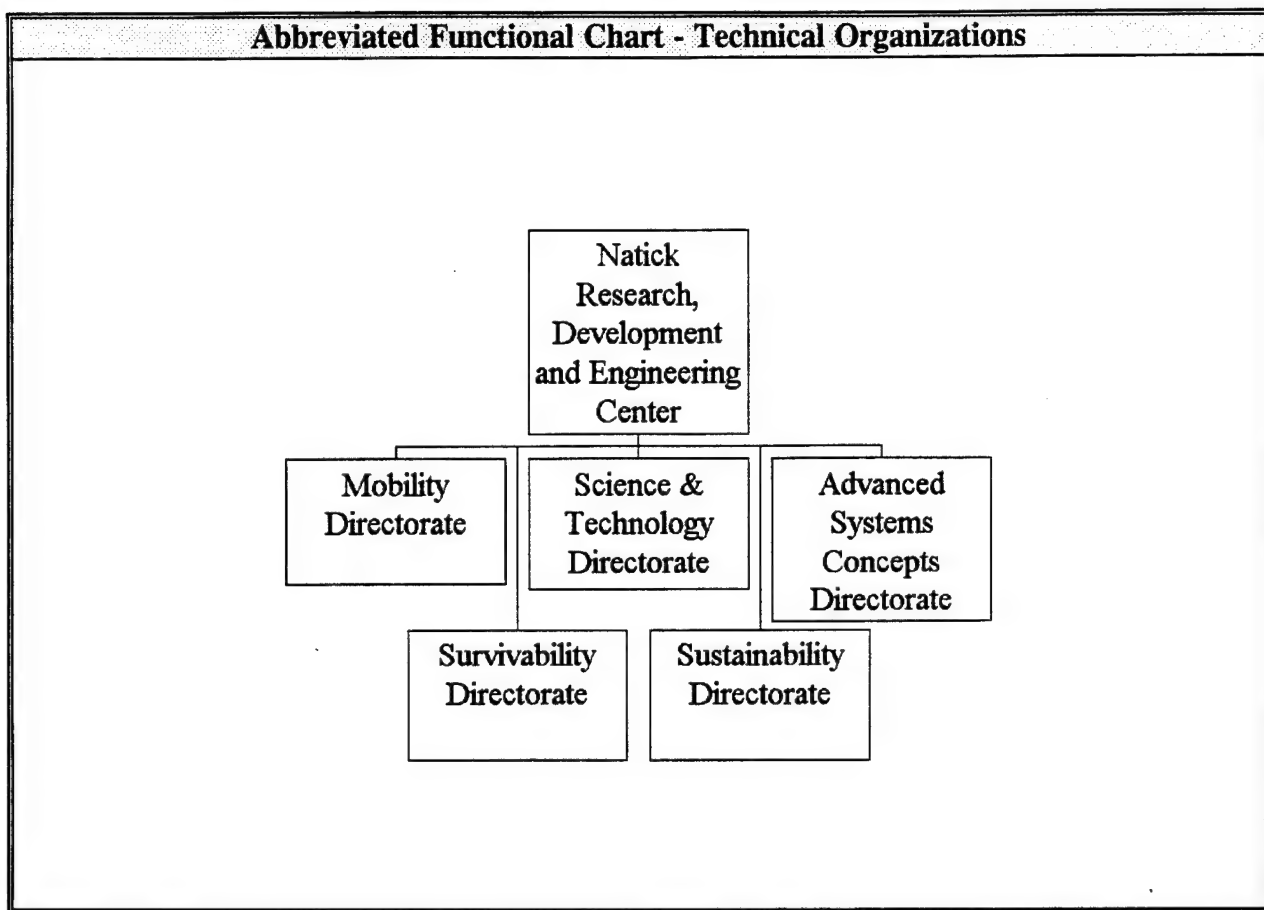
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	24	2	17	5
CIVILIAN	2,062	60	1,265	737
<b>TOTAL</b>	<b>2,086</b>	<b>62</b>	<b>1,282</b>	<b>742</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	1,094.000	<b>REAL PROPERTY</b>	216.000
ADMIN	136.000	* NEW CAPITAL EQUIPMENT	0.000
OTHER	137.000	<b>EQUIPMENT</b>	313.606
<b>TOTAL</b>	<b>1,367.000</b>	* NEW SCIENTIFIC & ENG. EQUIP.	25.269
<b>ACRES</b>	<b>4,000</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Natick Research, Development & Engineering Center



**Natick Research, Development & Engineering Center**

Natick, MA 01760-5000  
(508) 651-4300

Commander: Colonel Morris E. Price, Jr.  
Acting Tech Director: Mr. Phillip Brandler

**MISSION**

To be DoD's RD&E team developing soldier and related support systems to modernize and improve the warfighter's capabilities, performance, and quality of life. Maximize the individual warfighter's survivability, sustainability, mobility, combat effectiveness, and quality of life. Satisfy the needs of the soldier by treating the soldier as a system. Perform research, development, and engineering for integrated modular fighting systems, food, clothing, shelters, airdrop systems, and equipment that enhance mission effectiveness and quality of life in the field.

**CURRENT IMPORTANT PROGRAMS**

1. Maximize the combatant's survivability through development of integrated, modular, components that provide individual protection from ballistic, percutaneous chemical and biological, environmental, flame, surveillance, and directed energy threats.
2. Development of a 21st Century integrated, individual, modular fighting system that links the soldier to the digitized command and control network.
3. Sustain the soldier through Force Provider, a modular, air-transportable, collective support system that integrates environmentally controlled tentage, field kitchen and dining facilities, showers, latrines and laundries into a mini city for force protection, humanitarian relief, and rest and recuperation.
4. Develop family of performance enhancing, self-heating combat rations and modularized, rapidly deployable field feeding equipment systems for all the Services.
5. Enhance the mobility of the combatant with airdrop systems such as: Advanced Tactical Parachute System which consists of a new main parachute (to replace the standard T-10), a new reserve parachute, and a harness container and which provides delivery of parachutists safely and effectively at conditions beyond the capacities (weight, safety, reliability) of the current T-10 system and; Advanced Precision Airborne Delivery System, a family of autonomously guided, high altitude, offset delivery airdrop systems for precision delivery of equipment, vehicles and supplies.
6. Protect personnel and equipment systems through the development and fielding of transportable field shelters (both tactical and rigid wall) to house mobile command and control, communications, and field maintenance operations as well as to provide temporary environmental protection for personnel.

**EQUIPMENT/FACILITIES**

World unique, man-rated climatic chambers capable of simulating world-wide environmental conditions. Aircraft and airdrop load roller conveyor, static, and drop test facilities. Small scale flight test/ultralight aircraft. EMI test facility chromatographers. Assorted chromatographic capability to include GC, GC/MS, GDC, & HPLC. Spectrophotometers. CCD camera imaging system. Robotic chemical agent simulant materials test apparatus. Complete laser laboratory. Alexandrite (variable frequency) laser. Oligonucleotide & peptide synthesizers. Peptide sequencer. Thermal analysis equipment. Chambers simulating artificial light. Rain simulation facility. Terrain analysis system. Fiber spinning and recycling facility. Multi-layer film extrusion system. Dyeing, printing, and finishing fabrics pilot plant. Seams lab. Stitchless fabric welding equipment. Ballistics high speed impact test equipment. Materials testing machine (100 lb capacity). Food packaging facilities capable of prototype and pilot plant scale operations and simulation of rough handling. Food processing pilot plant facilities. Food service equipment engineering and evaluation labs. Microbiology lab. Bacteriology lab equipment. Molecular modeling graphics workstation. Biotechnology lab with automated respirator. Biorad FT/IR electron microscope. Fermentation facilities. Climatic chambers. Computer video-analysis systems. Microscopy lab with optical, electron and atomic force microscopes. Three-dimensional head scanner. Taste test lab. Instrumented manikins. Computerized pattern generating and grading system. Computerized rapid prototype machine. Prototype shelters fabrication facility. Twin screw extruder.

## Natick Research, Development &amp; Engineering Center

Natick, MA 01760-5000

(508) 651-4300

Commander: Colonel Morris E. Price, Jr.

Tech Director: Dr. Robert W. Lewis

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
RDT&E:			
6.1 ILIR	0.168	NA	0.168
6.1 Other	2.030	0.817	2.847
6.2 IED (Navy)	NA	NA	NA
6.2 Other	18.967	16.200	35.167
6.3	3.103	4.580	7.683
Subtotal (S&T)	24.268	21.597	45.865
6.4	4.024	13.569	17.593
6.5	12.116	15.030	27.146
6.6	13.746	8.789	22.535
6.7	0.090	0.021	0.111
Non-DOD	1.016	0.024	1.040
TOTAL RDT&E	55.260	59.030	114.290
Procurement	0.000	0.000	0.000
Operations & Maintenance	9.225	6.949	16.174
Other	1.599	0.470	2.069
TOTAL FUNDING	66.084	66.449	132.533

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

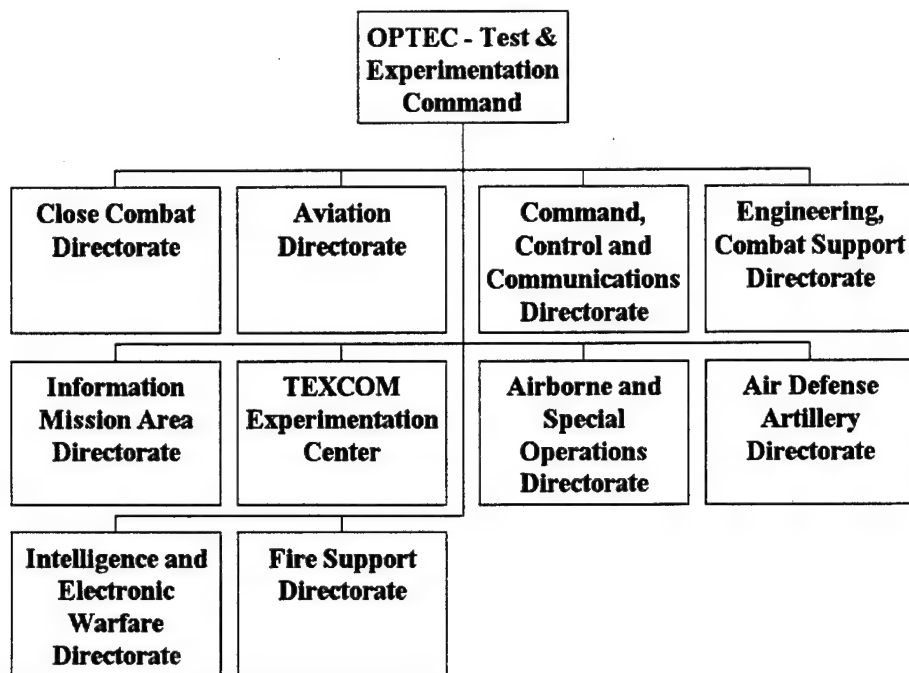
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	45	0	3	42
CIVILIAN	910	59	326	525
TOTAL	955	59	329	567

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	415.891	REAL PROPERTY	32.217
ADMIN	121.763	* NEW CAPITAL EQUIPMENT	0.002
OTHER	319.267	EQUIPMENT	38.155
TOTAL	856.921	* NEW SCIENTIFIC & ENG. EQUIP.	1.052
ACRES	174	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## OPTEC-Test and Experimentation Command

## Abbreviated Functional Chart - Technical Organizations



**OPTEC-Test and Experimentation Command**

Fort Hood, TX 76544-5065  
(817) 288-9114

Commander: BG Anthony C. Trifiletti  
Technical Dir: UNDER RECRUITMENT\*\*\*

**MISSION**

Support the Army materiel acquisition and force development processes by managing the User Testing Program and conducting operational testing to support force development.

**CURRENT IMPORTANT PROGRAMS**

KIOWA	Warrior Armed Scout Aircraft
ANVIS/HUD	Aviator's Night Vision Imaging System Heads Up Display for CH-47D
FMTV	Family of Medium Tactical Vehicles
ATCCS	Army Tactical Command & Control System
C17	Transport Aircraft
AFATDS	Advanced Field Artillery Tactical Data System
AWE	Advanced Warfighting Experiment
CBPS	Chemically Biological Protective Shelter
Longbow Apache	Modernized Apache Helicopter

**EQUIPMENT/FACILITIES**

Position location, high angle modular integrated target, video, data acquisition and reduction, thermal imaging, fiber optics and video multiplexer/demultiplexer, range timing, microwave, environmental measurement and survey.

**OPTEC-Test and Experimentation Command**

Fort Hood, TX 76544-5065

(817) 288-9114

Commander: BG Anthony C. Trifiletti

Technical Dir: UNDER RECRUITMENT\*\*\*

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.000	0.000	0.000
6.3	0.000	0.000	0.000
<b>Subtotal (S&amp;T)</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
6.4	4.278	9.023	13.301
6.5	0.000	0.000	0.000
6.6	45.002	20.267	65.269
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>49.280</b>	<b>29.290</b>	<b>78.570</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	42.137	0.000	42.137
Other	0.000	0.000	0.000
<b>TOTAL FUNDING</b>	<b>91.417</b>	<b>29.290</b>	<b>120.707</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

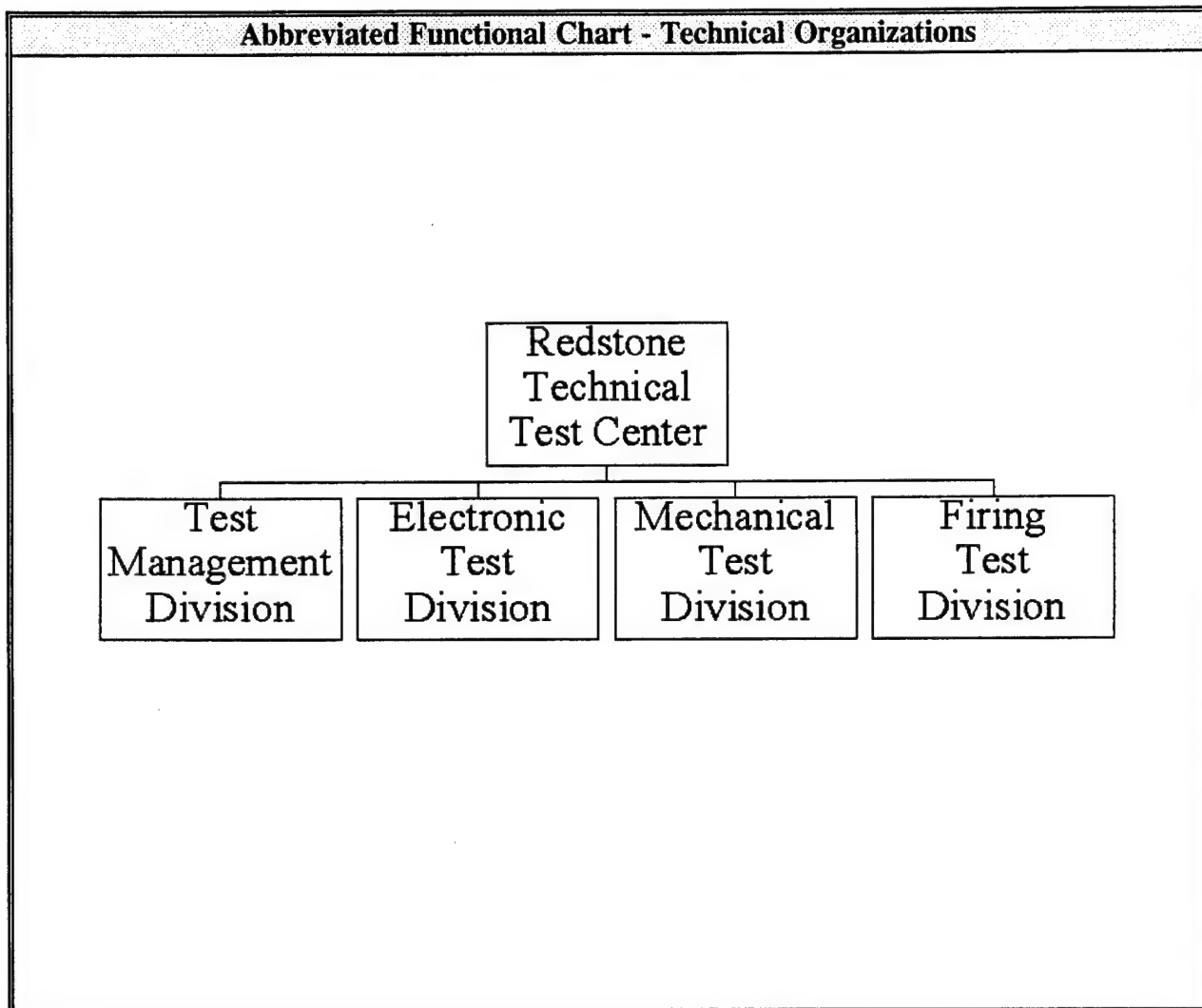
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	848	0	776	72
CIVILIAN	570	2	365	203
<b>TOTAL</b>	<b>1,418</b>	<b>2</b>	<b>1,141</b>	<b>275</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	19.900	<b>REAL PROPERTY</b>	6.300
ADMIN	41.000	* NEW CAPITAL EQUIPMENT	0.000
OTHER	0.000	<b>EQUIPMENT</b>	3.000
<b>TOTAL</b>	<b>60.900</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>22</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## Redstone Technical Test Center



**Redstone Technical Test Center**  
Redstone Arsenal, AL 35898-8052  
(205) 876-3552

Director: Larry H. Johnson  
Deputy Director: Carl E. Roberts

### MISSION

Plan, conduct, analyze, and report the results of technical tests of subsystems and components of major weapons systems and associated systems/materials; conduct life cycle technical testing of small rockets/guided missiles, and serve as DoD lightning test facility for hazardous items. RTTC provides testing and test support for rocket and missile research, development, test, and evaluation and other missions of authorized customers within the Department of Defense and outside the DoD, to include government and non-government organizations, domestic and foreign.

### CURRENT IMPORTANT PROGRAMS

Advanced Guided Missile System (HELLFIRE)  
Advanced Guided Missile System (LONGBOW)  
TOW Missile System  
Improved Target Acquisition System (ITAS)  
Improved Bradley Acquisition Subsystem (IBAS)  
Javelin Missile System  
Multiple Launch Rocket System (MLRS)  
ATACMS/BAT  
MPIM SRAW  
MICOM Missile Repair Parts Program  
MICOM Missile Shelf Life/Surveillance Program  
Enhanced Fiber Optic Guided Missile (EFOG-M)  
M72  
Bunker Defeat Munition (BDM)

**EQUIPMENT/FACILITIES**

Extensive equipment/instrumentation for performing complete functional tests, laboratory and field, of weapon system subsystems and components including IR, millimeter wave, and laser seekers and guidance sections, IR and visual target acquisition systems, antennas, fire control systems, gyroscopes, batteries, electronic and mechanical safe and arm devices, passive components, circuit, cards, integrated circuits and other electronic, mechanical, optical, and RF devices. Testing can be accomplished at environmental extremes and test methodology is rapidly expanding to incorporate hardware-in-the-loop (HIL) and state-of-art modeling and simulation (M&S) techniques to project subsystem/component test data to system level performance. Specialized and automated test instrumentation is available/can be developed for particular weapon system application in either a laboratory or remote site environment. Flight test ranges up to 8 Km are fully equipped with video and film fixed and tracking cameras, Doppler radars, GPS, telemetry and hard-line instrumentation, and tactical and simulated air and ground targets. A Simulation/Test Acceptance facility provides a unique, non-destructive HIL test capability for acceptance testing of all-up round (AUR) MMW-guided missiles. A 2000 acre, 5 Km, laser/optical range for designator/sensor testing has an elevated mound, a 75 ft tower with enclosed 2-story cab, and equipment/instrumentation/aircraft for captive carry and dirty battlefield scenarios. State-of-art instrumentation is available to accurately determine aircraft/target/sensor positions, provide atmospheric transmission measurements, determine target-to-background contrast measurements, and provide target thermal signatures. Development of high resolution, three dimensional, interactive, validated terrain models of RTTC ranges in the visual, infrared, and MMW bandwidths is in progress. Facilities for static and dynamic warhead testing are fully equipped with high speed cameras and flash radiography. Full range of equipment/chambers is available for nondestructive and climatic testing. Static test facilities can accommodate static and liquid rocket motors up to 150K pounds vertical thrust and 10M pounds horizontal thrust. Rocket motor dissection capability exists and a thermal ablative/ducted rocket engine test facility is nearing completion. Dynamic test capabilities include vibration, shock, drop, centrifuge, and rail impact testing. E3 facilities conduct EMRH/EMRO, EMI, antenna and RCS measurements. A Radar Environment Emulation System housed in a broadband, 100 DB shielded, anechoic chamber provides capability to test weapon systems to high power, pulse modulated EMR environments.

**Redstone Technical Test Center**  
 Redstone Arsenal, AL 35898-8052  
 (205) 876-3552

Director: Larry H. Johnson  
 Deputy Director: Carl E. Roberts

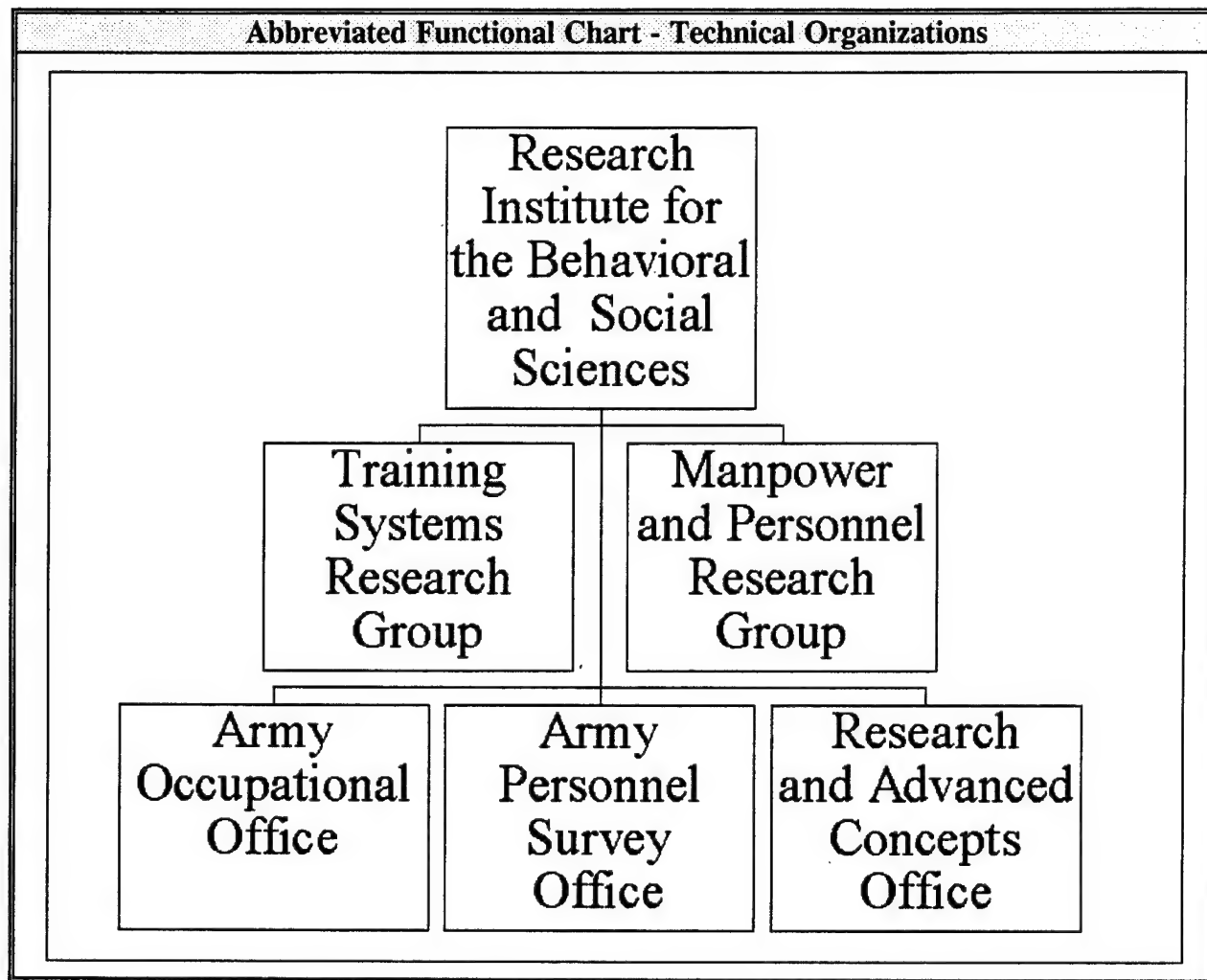
FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.000	0.600	0.600
6.3	0.000	0.200	0.200
<b>Subtotal (S&amp;T)</b>	<b>0.000</b>	<b>0.800</b>	<b>0.800</b>
6.4	0.000	20.300	20.300
6.5	3.600	0.000	3.600
6.6	0.000	0.000	0.000
6.7	0.000	7.900	7.900
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>3.600</b>	<b>29.000</b>	<b>32.600</b>
Procurement	0.500	9.700	10.200
Operations & Maintenance	0.000	10.200	10.200
Other	0.000	1.000	1.000
<b>TOTAL FUNDING</b>	<b>4.100</b>	<b>49.900</b>	<b>54.000</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	0	0	0	0
CIVILIAN	164	0	97	67
<b>TOTAL</b>	<b>164</b>	<b>0</b>	<b>97</b>	<b>67</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	460.000	<b>REAL PROPERTY</b>	146.000
ADMIN	52.000	* NEW CAPITAL EQUIPMENT	Not available for this report
OTHER	133.000	<b>EQUIPMENT</b>	Not available for this report
<b>TOTAL</b>	<b>645.000</b>	* NEW SCIENTIFIC & ENG. EQUIP.	Not available for this report
<b>ACRES</b>	<b>14,000</b>	* Subset of previous category. See Equip./Facilities Narrative.	

## Research Institute for the Behavioral &amp; Social Sciences



**Research Institute for the Behavioral & Social Sciences (Army Research Institute)**

Alexandria, VA 22333-5600

(703) 274-8637

Director: Dr. Edgar M. Johnson

Dep Dir for S&amp;T: Dr. Zita Samutis

**MISSION**

Maximize individual and unit performance through advances in human resources development in conjunction with effective and affordable training strategies to meet the full range of Army missions. ARI achieves its mission through activities of its research units located at its headquarters in Alexandria, VA and elsewhere CONUS and OCONUS (see the following list). In all cases ARI is a tenant at these locations where the host activity provides services (e.g., facilities, utilities) for a fee. Research Units: Simulator Systems Research Unit (Orlando, FL); Armored Forces Research Unit (Ft. Knox, KY); Infantry Forces Research Unit (Ft. Benning, GA); Reserve Component Training Research Unit (Boise, ID); Rotary-Wing Aviation Research Unit (Ft. Rucker, AL); Ft. Leavenworth Research Unit (Ft. Leavenworth, KS); Leader Development Research Unit (West Point, NY); Ft. Irwin NTC Element (Ft. Irwin, CA). Scientific Coordination Offices: Ft. Bragg SCO (Ft. Bragg, NC); USAREUR SCO (Heidelberg, GE); London SCO (London, England) and TRADOC SCO (Ft. Monroe, VA).

**CURRENT IMPORTANT PROGRAMS**

1. Battle command leader development
2. Human resources development: recruitment, selection, assessment and retention
3. Unit training techniques and strategies
4. Rotary wing training
5. Land warfare training

**EQUIPMENT/FACILITIES**

In-house experimental facilities include laboratory and computer facilities for real-time, man-in-the-loop experimentation. Unique assets include: the Army's Combat Training Centers (CTC Data Archive); combat arms simulators; Virtual Reality test bed; a modular, reconfigurable flight simulator for helicopter pilot research; simulators for UH-1FS, AH-64A & UH-60A helicopters; research access to SIMNET; and Battle Command Experimentation Center.

## Research Institute for the Behavioral &amp; Social Sciences (Army Research Institute)

Alexandria, VA 22333-5600

(703) 274-8637

Director: Dr. Edgar M. Johnson

Dep Dir/Cmdr: COL Larry J. Wagstaff

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.118	NA	0.118
6.1 Other	0.279	2.749	3.028
6.2 IED (Navy)	NA	NA	NA
6.2 Other	6.425	5.858	12.283
6.3	4.512	3.621	8.133
<b>Subtotal (S&amp;T)</b>	<b>11.334</b>	<b>12.228</b>	<b>23.562</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	6.846	3.846	10.692
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>18.180</b>	<b>16.074</b>	<b>34.254</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.416	0.024	0.440
Other	0.998	0.000	0.998
<b>TOTAL FUNDING</b>	<b>19.594</b>	<b>16.098</b>	<b>35.692</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

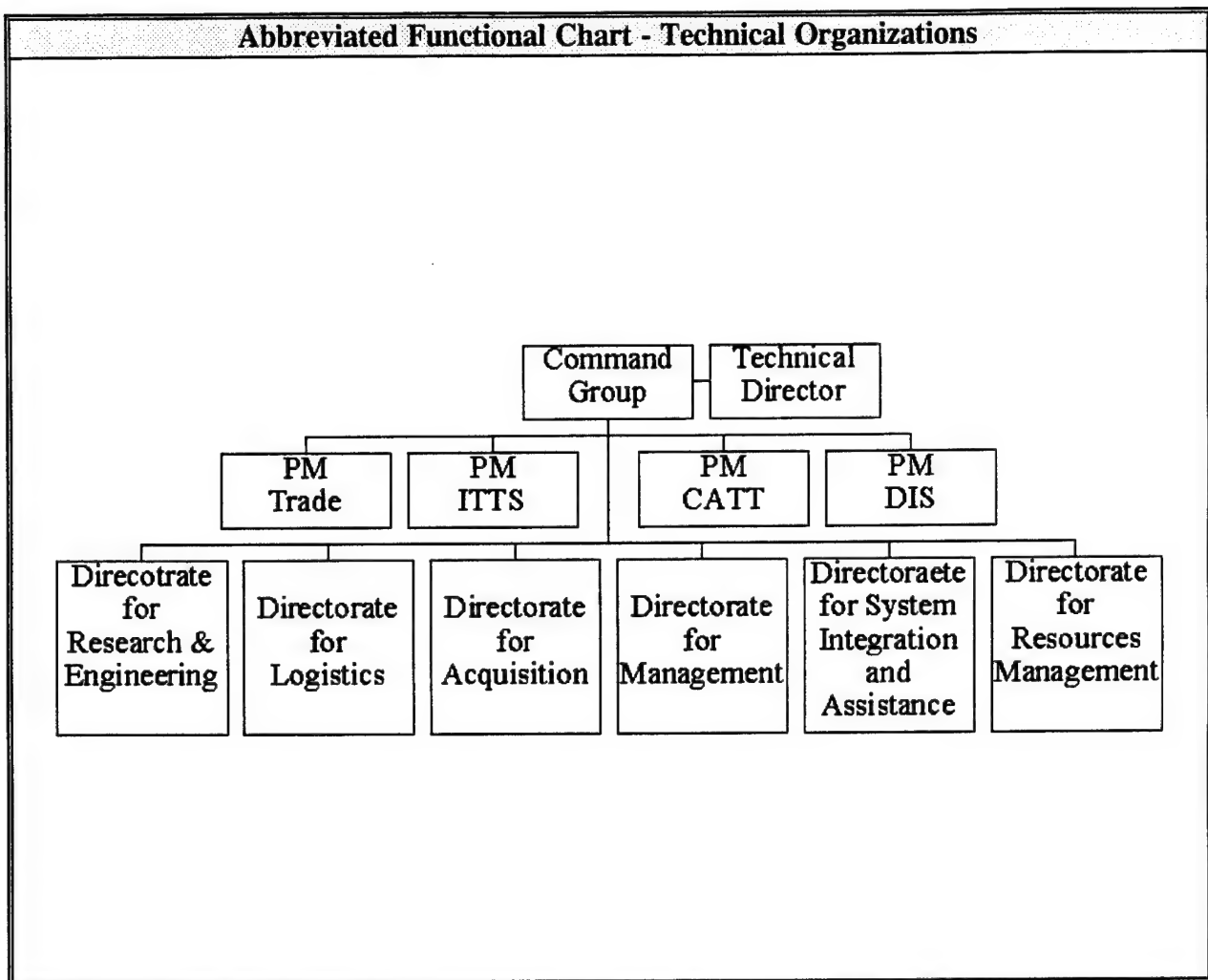
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	10	1	8	1
CIVILIAN	208	99	27	82
<b>TOTAL</b>	<b>218</b>	<b>100</b>	<b>35</b>	<b>83</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	23.800	<b>REAL PROPERTY</b>	4.100
ADMIN	85.215	* NEW CAPITAL EQUIPMENT	0.000
OTHER	10.900	<b>EQUIPMENT</b>	22.700
<b>TOTAL</b>	<b>119.915</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.095
<b>ACRES</b>	<b>0</b>	* Subset of previous category. See Equip./Facilities Narrative..	

NA = Not Applicable

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## Simulation, Training And Instrumentation Command



**Simulation, Training And Instrumentation Command**

Orlando, FL 32826

(473) 804-4000

Commander: BG John F. Michitsch

Technical Dir: Dr. Ronald Hofer

**MISSION**

The STRICOM mission is to provide training and test simulation, simulator, target and instrumentation products and services to develop and sustain war-fighting skills, create a synthetic environment to evaluate concepts and support requirements definition, and support material development and test and evaluation. The mission includes serving as the Department of Defense (DoD) Technical Manager for Distributed Interactive Simulation (DIS) and providing acquisition management and direction for the research, development, acquisition, and fielding of Army Training Devices, Simulations and Simulators (TDSS), and Major Test Instrumentation, Targets and Threat Simulation (ITTS). The mission encompasses cradle to grave life cycle acquisition beginning with technology base programs and following with each phase of the acquisition process through support and disposal.

**CURRENT IMPORTANT PROGRAMS**

Close Combat Tactical Trainer (CCTT) ; Mobile Automated Instrumentation Suite (MAIS) ; Field Artillery Combined Arms Tactical Trainer (FSCATT) ; Warfighting Simulation 2000 (WARSIM 2000); Combat Service Support Training Simulation System (CSSTSS) ; Simulated Area Weapons Effects (SAWE) ; Advanced Gunnery Training System (AGTS) ; Simulated Theater of War (STOW).

**EQUIPMENT/FACILITIES**

Facilities consist of office space owned by the Naval Air Warfare Center-Training Systems Division (NAWC-TSD) which is located within the Central Florida Research park. Use of space is in accordance with an Interservice Support Agreement between STIRCOM and the NAWC-TSD, which is reviewed annually.

## Simulation, Training And Instrumentation Command

Orlando, FL 32826

(473) 804-4000

Commander: BG John F. Michitsch

Technical Dir: Dr. Ronald Hofer

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.017	0.017
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.885	3.486	4.371
6.3	0.950	13.447	13.542
<b>Subtotal (S&amp;T)</b>	<b>0.980</b>	<b>16.933</b>	<b>17.913</b>
6.4	13.960	158.797	172.757
6.5	0.000	1.331	1.331
6.6	0.000	0.000	0.000
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>14.940</b>	<b>177.061</b>	<b>192.001</b>
Procurement	0.964	98.763	99.927
Operations & Maintenance	20.815	108.977	129.792
Other	7.628	128.800	136.428
<b>TOTAL FUNDING</b>	<b>44.347</b>	<b>513.801</b>	<b>558.148</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

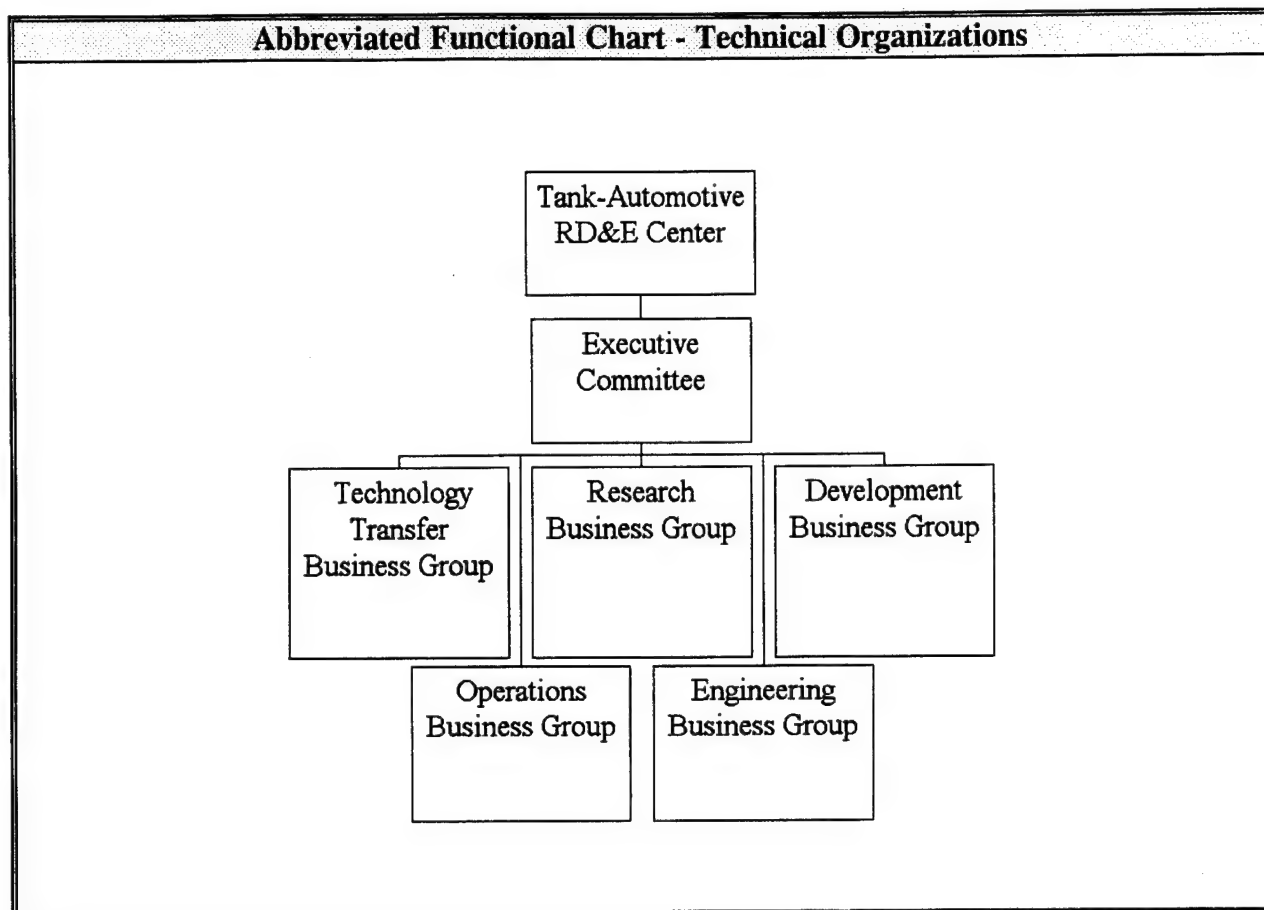
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	61	1	45	15
CIVILIAN	473	1	194	278
<b>TOTAL</b>	<b>534</b>	<b>2</b>	<b>239</b>	<b>293</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	0.000	<b>REAL PROPERTY</b>	0.000
ADMIN	0.000	* NEW CAPITAL EQUIPMENT	0.000
OTHER	0.000	<b>EQUIPMENT</b>	0.000
<b>TOTAL</b>	<b>0.000</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>0</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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**Tank-Automotive Research, Development & Engineering Center**



**Tank-Automotive Research, Development & Engineering Center**

Warren, MI 48397-5000

(810) 574-6265

Dir, RDE Center: Mr. Wayne Wheelock

Tech Director: Dr. Richard E. McClelland

**MISSION**

To conduct research, development and engineering to achieve global technology superiority in ground vehicles and to stimulate the transition to a growing, integrated, national industrial capability which provides the most advanced, affordable military systems and the most competitive commercial products.

**CURRENT IMPORTANT PROGRAMS**

- 1.) Advanced Land Combat Top Level Demo including ATD's Composite Armored Vehicle, Crewman's Associate, Hit Avoidance.
- 2.) Emerging systems i.e. Peacekeeper Vehicle, Scout Vehicle.
- 3.) Vehicle Performance Simulation and Virtual Prototyping.
- 4.) Technology Demonstrations to include Future Main Battle Tank, Future Scout Vehicle, Advanced Survivability Technologies, Combat Vehicle Command and Control, and Advanced Mobility Systems.
- 5.) Support to PEO's i.e. Crusader, Bradley Block III, Digitization of the Battlefield, M1A3 Life Cycle Software Support.
- 6.) Weapon System Management and Configuration Control of 184 Out of Production Vehicle Systems including Data Management and repository for entire DOD Ground Fleet, all DOD Ground Vehicle Product Assurance.

**EQUIPMENT/FACILITIES**

TARDEC is the only Army/DoD Tank-Automotive Research, Development and Engineering Center committed to overall ground vehicle technology and integration.

VETRONICS SIMULATION THEATER - the scope of this project includes a battlefield observation room, simulation control room and a conference room.

NATIONAL AUTOMOTIVE CENTER, a joint venture with the American automotive industry and TARDEC, is leading the way in "dual use" of critical technologies.

SUPERCOMPUTER, the Army Regional Supercomputing Facility (ARSF) at TARDEC is one of only three such facilities within the Army. The ARSF provides computational services to TARDEC, defense contractors, supporting activities such as the Heavy Force Modernization Program, and other major Army commands.

**EQUIPMENT/FACILITIES**

**PROPULSION LAB** has six engine and transmission test cells, a chassis dynamometer facility, a truck drive line test cell, and a combat vehicle test cell.

**ENVIRONMENTAL TEST CELL** performs high temperature performance tests on vehicles.

**VETRONICS INTEGRATION LAB** utilizes the Standard Army Vetronics Architecture to provide globally shared functions common to vehicle subsystems.

**COMBAT VEHICLE COMMAND AND CONTROL FACILITY** provides an automated command and control system for armor/infantry vehicles, a tactical situation display in all vehicles, and supports the Army Horizontal Technology Insertion Program.

**CREW STATION/TURRET MOTION BASE SIMULATOR** provides vehicle dynamic full-scale simulation.

**BRIDGE TEST FACILITY** used in testing static or dynamic cyclic loads on various bridge designs.

**WATER QUALITY AND WATER TEST CELL LABORATORIES** - used for the testing of various water filter elements, water filter systems, and provides chemical analytical support to water purification engineer functions.

**FUEL EQUIPMENT TEST LABORATORY** used for testing and evaluating fuel pumps, fuel filter elements, fuel filter separators, fuel nozzles and engine fuel filter elements.

**GREASE AND FLUID LABORATORY** provides analytical support required for the qualification, evaluation, and analysis of greases, hydraulic fluids, antifreeze, solid film, and general purpose lubricants.

**FUELS AND LUBRICANTS LABORATORY** provides analytical support required for the analysis of engine oils, gear lubricants, diesel and jet fuel.

**US ARMY FUELS AND LUBRICANTS RESEARCH LABORATORY (SWRI)** used to conduct studies of physical properties, performance characteristics, and chemical composition of fuels, lubricants, and other power train fluids.

Other facilities and equipment include: software engineering, signature, dynamic motion simulator (seat simulator), track and suspension, fabrication, computer-aided design, laser, packaging engineering, model shop, metallurgical, mechanical test, animation capabilities used in support of virtual prototyping, rapid prototyping, visualization capabilities, sheet/metal welding, machine shop, assembly shop, electrical, battery test, instrumentation, IR imaging, thermal wave microscopy, applied engineering, robotics engineering, air cleaner, tire, ballistic testing, armor integration, heat exchangers, ballistic grille.

## Tank-Automotive Research, Development &amp; Engineering Center

Warren, MI 48397-5000

(810) 574-6265

Dir, RDE Center: Mr. Wayne Wheelock

Tech Director: Dr. Richard E. McClelland

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
RDT&E:			
6.1 ILIR	0.238	NA	0.238
6.1 Other	0.242	1.163	1.405
6.2 IED (Navy)	NA	NA	NA
6.2 Other	4.416	36.704	41.120
6.3	0.000	39.641	39.641
Subtotal (S&T)	4.896	77.508	82.404
6.4	0.000	15.200	15.200
6.5	0.000	6.225	6.225
6.6	0.000	15.877	15.877
6.7	0.034	2.426	2.460
Non-DOD	23.426	10.637	34.063
TOTAL RDT&E	28.356	127.873	156.229
Procurement	0.000	0.718	0.718
Operations & Maintenance	32.864	9.576	42.440
Other	14.579	6.869	21.448
TOTAL FUNDING	75.799	145.036	220.835

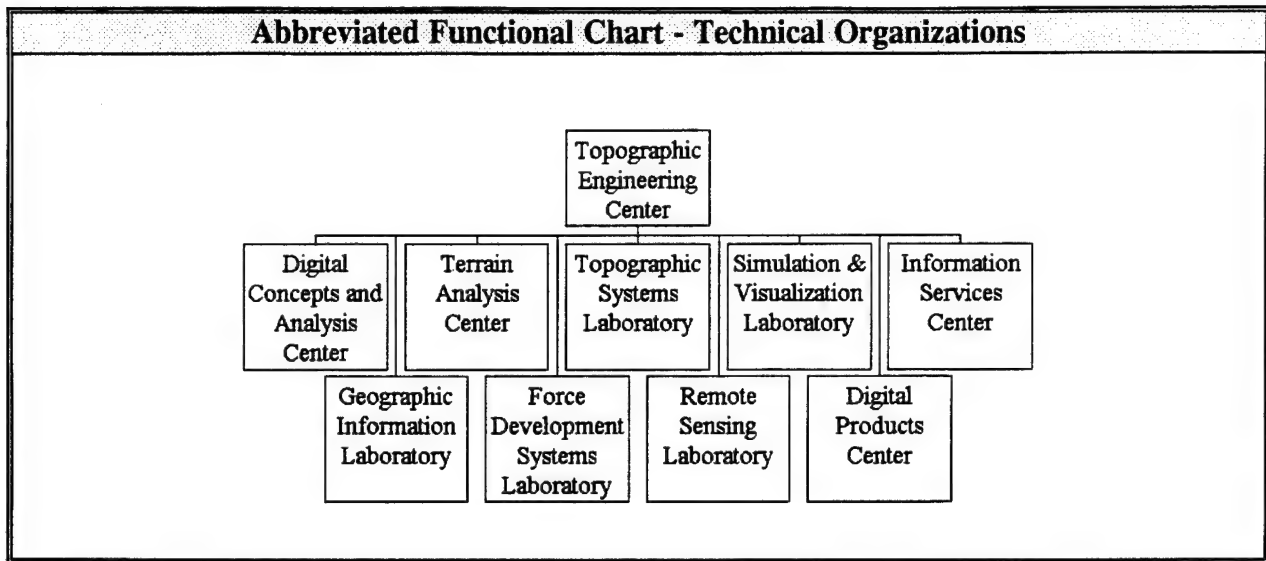
MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	29	0	26	3
CIVILIAN	1,333	24	696	613
TOTAL	1,362	24	722	616

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	575.137	REAL PROPERTY	108.408
ADMIN	217.480	* NEW CAPITAL EQUIPMENT	0.230
OTHER	72.557	EQUIPMENT	208.600
TOTAL	865.174	* NEW SCIENTIFIC & ENG. EQUIP.	5.242
ACRES	105	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

Topographic Engineering Center



**Topographic Engineering Center**

Alexandria, VA 22315-3864

(703) 355-2654

Director: Walter E. Boge

Cmdr./Dep Dir.: Louis R. Desanzo

**MISSION**

The U.S. Army Topographic Engineering Center (TEC) is a field operating activity under the command of the Commanding General, U.S. Army Corps of Engineers (USACE). TEC's mission is to provide the warfighter with a superior knowledge of the battlefield and support the nation's civil and environmental initiatives through research, development and the application of expertise in the topographic, environmental and related sciences. This is a tri-mission involving research and development (R&D), system acquisitions (procurement), and operations and maintenance (O&M) programs. The TEC R&D programs (both military and civil) are under the staff supervision of USACE Director of Research and Development, the acquisition programs are under the staff supervision of PEOCCS/DCSOPS, and the O&M programs are under the staff supervision of the Office of the Chief of Engineers (Pentagon). The Engineer Strategic Studies Center (ESSC), under the operational control of the Deputy Chief of Engineers, serves as the Chief of Engineers' center of creative, innovative analytical thought.

Vision: Inspired people providing new topographic capabilities for America.

**CURRENT IMPORTANT PROGRAMS**

Development in the S&T Base of capabilities to exploit hyperspectral data derived from remote sensing platforms (data libraries and exploitation hardware); interferometric synthetic aperture radar data for high resolution elevation data and images for feature detection; stereo image exploitation for mapping information to support mission planning, rehearsal and target development; development of digital terrain data standards meeting DoD requirements and needs for operations and simulation; and terrain visualization supporting rapid, world wide deployment of contingency forces. S&T support to ARPA in image exploitation, autonomous navigation and computer vision, hyperspectral analysis, and terrain visualization for simulation and warfighting systems. Developmental and demonstration support to PM, Joint Precision Strike, Developmental Support to the Army Space Programs Office and the PEO-Command and Control Systems for the Combat Terrain Information System, as well as the US Geological Survey, Central Intelligence Agency, and Central Imagery Office for stereo image exploitation.

**EQUIPMENT/FACILITIES**

Facilities include a computer image generation facility to study and demonstrate computer techniques for 3-D perspective display of topographic information for mission planning, rehearsal and command and control; a digital image processing facility with advanced displays and digital image analysis capabilities; an advanced computer vision testbed for generation of image understanding methodology for locating enemy formations from imagery; an artificial intelligence test bed for developing automated image analysis and feature extraction techniques; and special measurement equipment permitting the gathering of hyperspectral data elements for advanced imaging systems development. Major computer systems include DECVAX models 780/785, MILVAX II, Connection Machines II and V, Ardent/Stardent, and Silcon Graphics Power Vision Indigo.

## Topographic Engineering Center

Alexandria, VA 22315-3864

(703) 355-2654

Director: Walter E. Boge

Cmdr./Dep Dir.: Louis R. Desanzo

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.198	NA	0.198
6.1 Other	2.162	0.332	2.494
6.2 IED (Navy)	NA	NA	NA
6.2 Other	6.900	3.284	10.184
6.3	1.356	3.096	4.452
<b>Subtotal (S&amp;T)</b>	<b>10.616</b>	<b>6.712</b>	<b>17.328</b>
6.4	1.071	1.308	2.379
6.5	5.332	2.256	7.588
6.6	0.000	0.000	0.000
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>17.019</b>	<b>10.276</b>	<b>27.295</b>
Procurement	0.729	0.363	1.092
Operations & Maintenance	8.513	5.141	13.654
Other	3.672	33.877	37.549
<b>TOTAL FUNDING</b>	<b>29.933</b>	<b>49.657</b>	<b>79.590</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

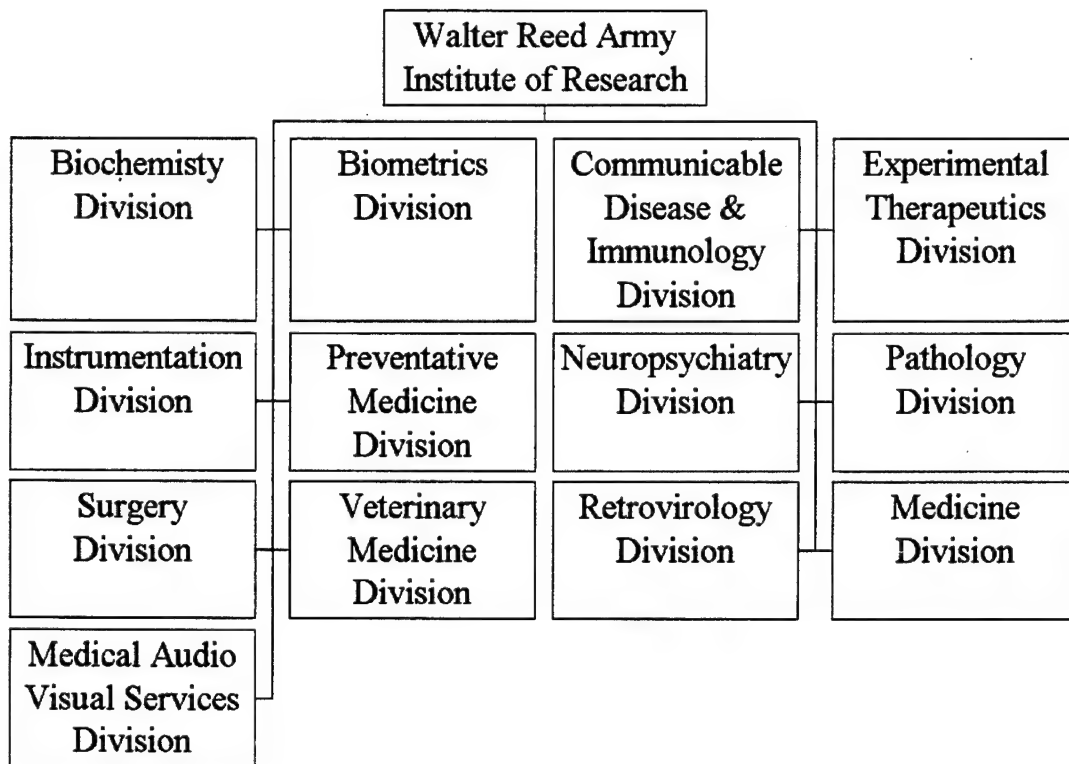
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	10	0	3	7
CIVILIAN	423	14	252	157
<b>TOTAL</b>	<b>433</b>	<b>14</b>	<b>255</b>	<b>164</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	86.776	<b>REAL PROPERTY</b>	22.400
ADMIN	35.081	* NEW CAPITAL EQUIPMENT	0.000
OTHER	53.134	<b>EQUIPMENT</b>	17.971
<b>TOTAL</b>	<b>174.991</b>	* NEW SCIENTIFIC & ENG. EQUIP.	4.481
<b>ACRES</b>	<b>0</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## Walter Reed Army Institute of Research

## Abbreviated Functional Chart - Technical Organizations



**Walter Reed Army Institute of Research**

Washington, DC 20307-5100

(202) 782-3551

Director: COL August J. Salavado

Deputy Director: COL John W. Boslego

**MISSION**

Perform research on the medical prevention of disability, incapacitation, and death, and the rapid treatment and return to duty of military members. Accomplish through a program of basic and applied research approaches and doctrine to medically protect against threats from the natural environment, military weapons and technology, and operational stress. Focus and identify military medical research which has great capacity to influence operational readiness.

**CURRENT IMPORTANT PROGRAMS**

Development of drugs and vaccines to protect against infectious diseases to deployed soldiers.  
Development of means for the prevention of operational stress in the combat environment.  
Development of combat casualty care strategies for the prevention of injuries from blast and directed energy and prevention of sepsis and shock following traumatic wounds or thermal injury.  
Development of medical strategies for protecting soldiers from chemical and biological warfare threat.  
Evaluation of military health hazards of Army weapon systems and manpower programs, in coordination with AMC, TRADOC, and ODCSPER.

### EQUIPMENT/FACILITIES

Complete analytical chemistry capability to include gas chromatography and mass spectrometry; drug development from computer-aided drug design and synthesis to field testing for efficacy and safety; vaccine development from basic research and computer assisted recognition of relevant vaccine candidates to animal model development and production, testing and production, testing and licensing; complete infectious disease diagnosis to include isolation and culture of causative agents and serological diagnosis; perform comprehensive human behavioral research studies both in the laboratory setting and in the field; evaluate health hazards from blast, toxic, gas, and laser energy as well as materiel, and approaches to combat casualties from these same sources; perform complete epidemiology on military medical threats and accidents from infectious diseases and toxins; through pathological evaluation to include histopathological diagnosis and transmission and scanning electron microscopy studies; basic research studies into the pathophysiology of disease utilizing modern cell physiology and hematological techniques; testing of drugs, vaccines and medical doctrine in overseas locations in Korea, Brazil, Germany, Thailand and Kenya.

#### A. WRAMC AND FOREST GLEN

##### BUILDING    AGE

T-20	23 YRS
40	63 YRS (A WING)
	70 YRS (B WING)
	33 YRS (C WING)
	24 YRS (D WING)
83	52 YRS
101	105 YRS
189	50 YRS
500	42 YRS
501	41 YRS
502	41 YRS
504	41 YRS
505	41 YRS
506	40 YRS
508	41 YRS
511	24 YRS
512	39 YRS

#### B. CONUS DETACHMENTS

##### BUILDING    AGE

BAFD	29 YRS
WPAFB	31 YRS
BLOOD	(IN LEASED SPACE)
DRD	

**EQUIPMENT/FACILITIES****C. OCONUS SPECIAL FOREIGN ACTIVITIES**

BUILDING	AGE
USAMRU-EUROPE	66 YRS
USAMRU-BRAZIL	48 YRS
AFRIMS HQ BLDG	34 YRS
AFRIMS LIBRARY MED BLDG	27 YRS
AFRIMS MOTOR POOL	17 YRS
AFRIMS MAIN RESEARCH BLDG	31 YRS
AFRIMS VET MED BLDG	29 YRS
USAMRU-KENYA	

## Walter Reed Army Institute of Research

Washington, DC 20307-5100

(202) 782-3551

Director: COL August J. Salavado

Deputy Director: COL John W. Boslego

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	3.052	NA	3.052
6.1 Other	10.598	0.693	11.291
6.2 IED (Navy)	NA	NA	NA
6.2 Other	20.251	6.654	26.905
6.3	14.144	0.321	14.465
<b>Subtotal (S&amp;T)</b>	<b>48.045</b>	<b>7.668</b>	<b>55.713</b>
6.4	2.840	0.009	2.849
6.5	1.113	0.334	1.447
6.6	0.000	0.000	0.000
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>51.998</b>	<b>8.011</b>	<b>60.009</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.000	0.000	0.000
Other	42.836	0.091	42.927
<b>TOTAL FUNDING</b>	<b>94.834</b>	<b>8.102</b>	<b>102.936</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

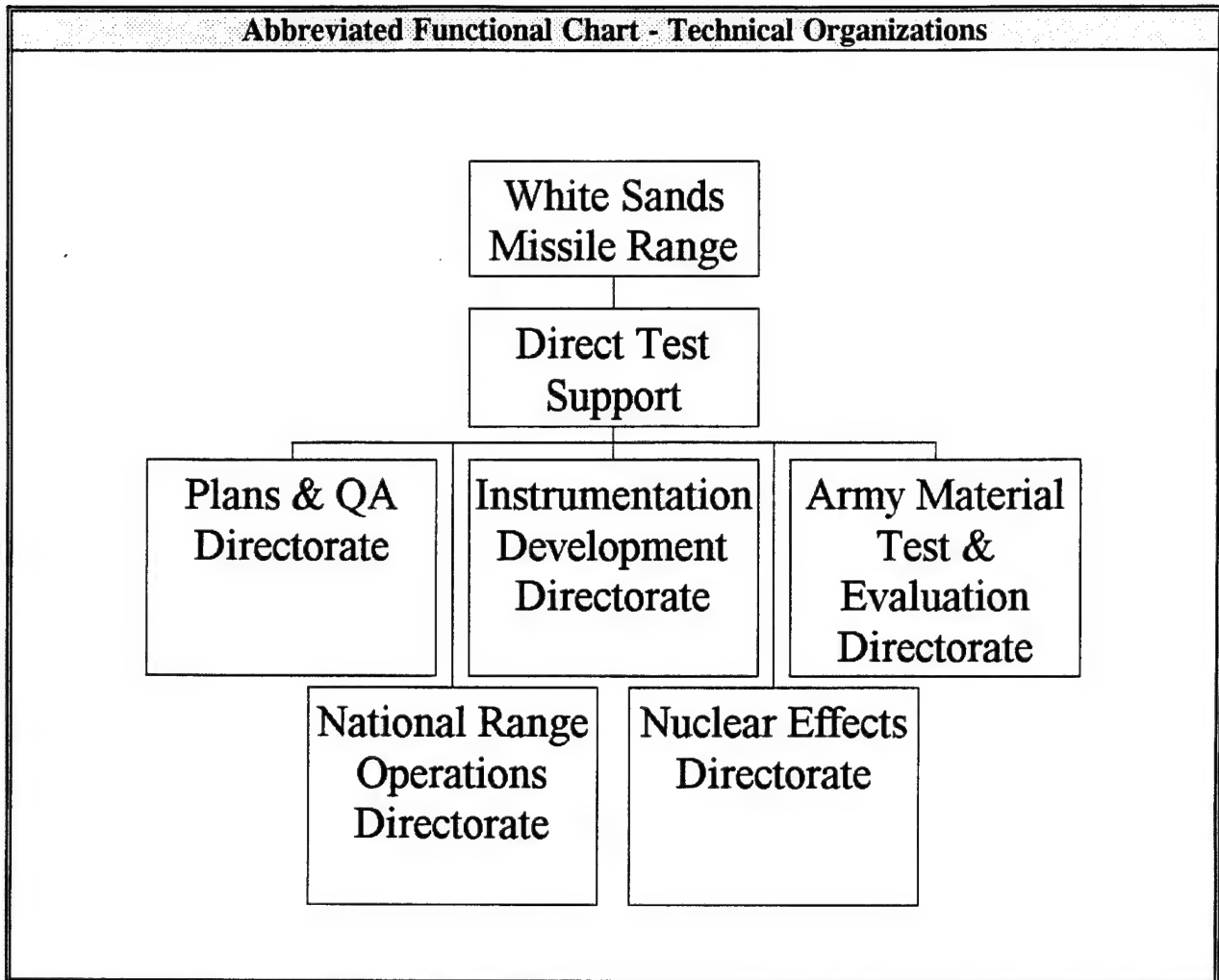
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	489	185	9	295
CIVILIAN	473	110	139	224
<b>TOTAL</b>	<b>962</b>	<b>295</b>	<b>148</b>	<b>519</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	403.544	<b>REAL PROPERTY</b>	16.460
ADMIN	178.372	* NEW CAPITAL EQUIPMENT	0.000
OTHER	151.472	<b>EQUIPMENT</b>	62.353
<b>TOTAL</b>	<b>733.388</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>0</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## White Sands Missile Range



**White Sands Missile Range**

White Sands Missile, NM 88002-5000  
(505) 678-2121

Commander: BG Jerry L. Laws  
Technical Dir.: George A. Orlicki

**MISSION**

The White Sands Missile Range mission is to provide and operate a tri-service national range, test and evaluate DoD systems, and provide installation support to its customers and tenants.

**CURRENT IMPORTANT PROGRAMS**

Army-Patriot.  
Army Tactical Missile System (ATACMS).  
High Endoatmospheric Defense Interceptor-Kinetic Interceptor Experiment (HEDI-KITE).  
Advanced Medium Range Air-to-Air Missile (AMRAAM).  
Standard Missile (SM).  
Multiple Launch Rocket System (MLRS)  
Space Shuttle  
Hawk Hip  
Bright Eyes  
Research Rockets  
Tactical Training Program

**EQUIPMENT/FACILITIES**

White Sands Missile Range has a variety of equipment, facilities and features that make it a premier Test Range. These features include: the Largest Inland Air and Landspace Range, Full-Time Restricted Airspace and Varied Terrain Features. WSMR also has Range Instrumentation which includes the Multiple Object Tracking Radar (MOTR), Remote Control Optical Tracking Mounts, and Telemetry and Radar Instrumentation. WSMR has a complete Environmental and Scientific Laboratory Suite (including a microbiological test chamber, large environmental test chamber, chemistry lab, metallurgy lab, and dynamics lab) and Nuclear Effects testing facilities such as the Solar Furnace, Electromagnetic Pulse, Linear Electron Accelerator, Electro-Magnetic Radiation Effects and the Large Blast Thermal Simulator.

## White Sands Missile Range

White Sands Missile, NM 88002-5000  
(505) 678-2121

Commander: BG Jerry L. Laws  
Technical Dir.: George A. Orlicki

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDTE&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.156	0.005	0.161
6.2 IED (Navy)	NA	NA	NA
6.2 Other	4.994	0.179	5.173
6.3	3.111	2.487	5.598
<b>Subtotal (S&amp;T)</b>	<b>8.261</b>	<b>2.671</b>	<b>10.932</b>
6.4	6.141	5.175	11.316
6.5	0.000	0.000	0.000
6.6	121.555	31.539	153.094
6.7	0.000	0.000	0.000
Non-DOD	3.701	2.663	6.364
<b>TOTAL RDTE&amp;E</b>	<b>139.658</b>	<b>42.048</b>	<b>181.706</b>
Procurement	19.162	10.518	29.680
Operations & Maintenance	3.104	3.570	6.674
Other	21.939	23.415	45.354
<b>TOTAL FUNDING</b>	<b>183.863</b>	<b>79.551</b>	<b>263.414</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	2.900

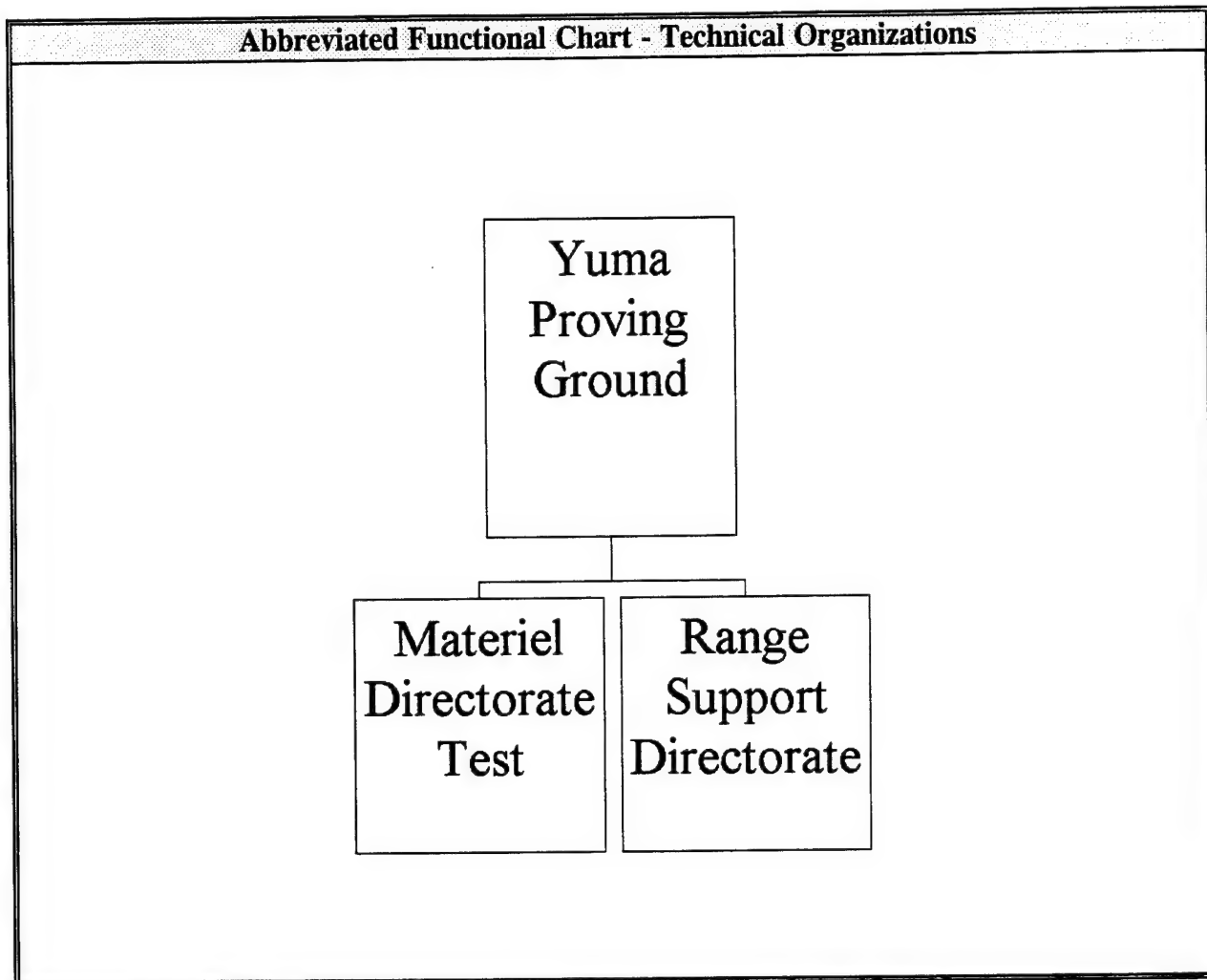
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	538	0	139	399
CIVILIAN	2,207	10	559	1,638
<b>TOTAL</b>	<b>2,745</b>	<b>10</b>	<b>698</b>	<b>2,037</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	106.542	<b>REAL PROPERTY</b>	421.343
ADMIN	863.105	* NEW CAPITAL EQUIPMENT	10.000
OTHER	4,327.973	<b>EQUIPMENT</b>	379.000
<b>TOTAL</b>	<b>5,297.620</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>2,162,485</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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**Yuma Proving Ground**



**Yuma Proving Ground**

Yuma, AZ 85365-9102

(602) 328-6533

Commander: Richard R. Walker

Technical Dir: James Wymer

**MISSION**

Plan, execute, support and report tests of aircraft weapons, long-range artillery, armored vehicles, tank weapons, munitions and aerial delivery systems through the use of a multi-purpose test range. Conduct tests of military equipment in natural desert environment.

**CURRENT IMPORTANT PROGRAMS**

M1-A1 Abrams Tank

M-2 Bradley IFV

Palletized Load System (PLS)

Search and Destroy Armor (SADARM)

Tank Main Armament System (TMAS)

Liquid Propellant Gun

C-17 Cargo Aircraft

Low Altitude Retrorocket Recovery System (LARRS)

OH-58D Kiowa Warrior

Unmanned Aerial Vehicle Close Range (UAV-CR)

RAH-66 Comanche Target Acquisition Systems

AH-64D Apache Longbow

**EQUIPMENT/FACILITIES**

**WEAPONS FIRING CHAMBER:** Capable of testing full-sized combat/tactical vehicles and helicopter, artillery and direct fire systems from -65°F to 160°F with humidity from 5% to 95%.

**WEAPONS ACCURACY RANGE:** The artillery range is sufficiently large to fire all artillery to maximum range and is fully instrumented with radar, multi-camera tracking mounts, telemetry and microwave systems, specially developed instrumented impact fields and communication systems. The aircraft weapons range is specially developed for helicopter armament and instrumented with multiple laser trackers, radars, telemetry video, multi-camera tracking mounts, remote control moving targets, GPS-based moving target tracking system and integrated real-time mission control and data processing center. The aircraft range includes specialty sites for ground mounted tests of aircraft weapons. All range areas are under restricted airspace to a minimum of 80,000 ft.

**AUTOMOTIVE TEST COURSES:** Paved, unpaved, hilly, Middle East, gravel, dust, fording basin, vehicle swimming, dynamometer capability for all Army systems. Complete shop and overhaul capability for Army vehicles and weapons systems.

**AIR CARGO TEST FACILITY:** Army airfield, two (2) runways to 6000 ft., two (2) hangars, Air Cargo Complex for test of airdrop systems and airdrop qualification of military systems and ammunition.

**TEST ENVIRONMENT:** Complete environment test capability including 30,000 lb. vibration tables, rain, humidity, dust and other chambers. Laboratory facilities including X-ray, chemical and materials lab.

**Yuma Proving Ground**  
 Yuma, AZ 85365-9102  
 (602) 328-6533

Commander: Richard R. Walker  
 Technical Dir: James Wymer

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	1.891	1.729	3.620
6.3	0.700	0.754	1.454
<b>Subtotal (S&amp;T)</b>	<b>2.591</b>	<b>2.483</b>	<b>5.074</b>
6.4	4.370	3.939	8.309
6.5	1.158	1.130	2.288
6.6	33.183	19.214	52.397
6.7	0.000	0.000	0.000
Non-DOD	3.645	3.074	6.719
<b>TOTAL RDT&amp;E</b>	<b>44.947</b>	<b>29.840</b>	<b>74.787</b>
Procurement	22.749	5.822	28.571
Operations & Maintenance	2.105	1.044	3.149
Other	5.378	0.816	6.194
<b>TOTAL FUNDING</b>	<b>75.179</b>	<b>37.522</b>	<b>112.701</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	165	0	13	152
CIVILIAN	764	0	148	616
<b>TOTAL</b>	<b>929</b>	<b>0</b>	<b>161</b>	<b>768</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	22.175	<b>REAL PROPERTY</b>	95.337
ADMIN	161.300	* NEW CAPITAL EQUIPMENT	2.265
OTHER	1,709.159	<b>EQUIPMENT</b>	283.763
<b>TOTAL</b>	<b>1,892.634</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>838,376</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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DEPARTMENT OF THE NAVY

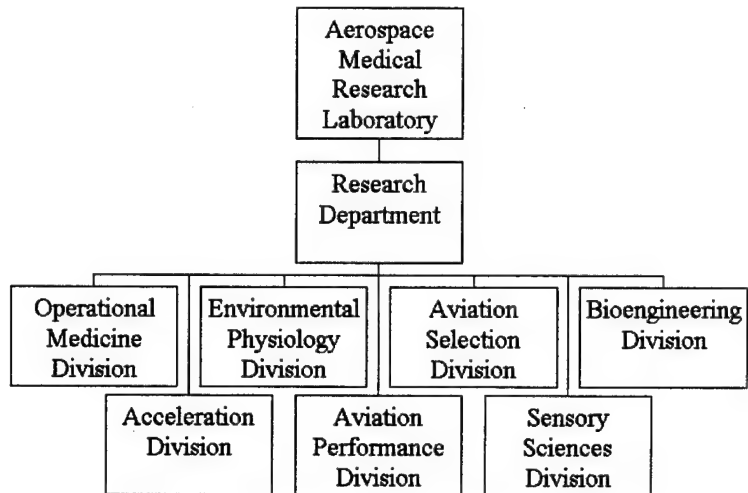
**DEPARTMENT OF THE NAVY**

The Navy's sixteen (16) In-House RDT&E Activities are:

Naval Aerospace Medical Research Laboratory .....	3-2
Naval Air Warfare Center .....	3-8
Naval Biodynamics Laboratory .....	3-14
Navy Clothing and Textile Research Facility .....	3-18
Naval Command, Control and Ocean Surveillance Center .....	3-22
Naval Dental Research Institute .....	3-28
Naval Facilities Engineering Services Center .....	3-32
Naval Health Research Center .....	3-38
Naval Medical Research Institute .....	3-42
Naval Medical Research Unit #2 .....	3-46
Naval Medical Research Unit #3 .....	3-50
Navy Personnel Research and Development Center .....	3-56
Naval Research Laboratory .....	3-62
Naval Submarine Medical Research Laboratory .....	3-70
Naval Surface Warfare Center .....	3-74
Naval Undersea Warfare Center .....	3-80

## Naval Aerospace Medical Research Laboratory

## Abbreviated Functional Chart - Technical Organizations



**Naval Aerospace Medical Research Laboratory**  
Pensacola, FL 32508-1046  
(904) 452-3287

Commander: CAPT J.C. Patee, MSC  
Chief Scientist: Dr. R. Stanny

### MISSION

Conduct RDT&E in aviation medicine and the allied sciences to enhance the health, safety, readiness and physical tolerances of Navy and Marine Corps personnel in the effective performance of contingency and peacetime missions, as well as to perform such other functions or tasks as may be required by higher authority.

### CURRENT IMPORTANT PROGRAMS

Effects of Biomedical Countermeasure on Sustained Operations; Vestibular Transduction, Motion Perception and Motion Sickness; Performance Based Medical Standards for Naval Aviation; Vision Standards; Night Vision Devices (NVDS); Development of a new generation of night vision devices based in digital enhancement of infrared and standard NVG images; Development of Hearing Protection Devices; Auditory Standards; and Continuous and Sustained Operations. Advanced Technology Demonstration of the effectiveness of vibrotactile stimulation for maintaining spatial orientation.

### EQUIPMENT/FACILITIES

The VISION LABORATORY includes a mobile night vision goggle (NVG) training facility ("NITE Lab") that can be used to train NVG users in the field. The "NITE Lab" is equipped with numerous NVG demonstrations and training aids as well as optical testing and vision equipment. The laboratory has facilities for recording, digitizing, and mathematically filtering and enhancing visual images. In cooperation with the helicopter training facility at Whiting Field (TRAWING FIVE), the laboratory is able to non-invasively record the instrument scan patterns of pilots flying the motion-based, full-scale helicopter instrument trainer.

The PSYCHOACOUSTICS LABORATORY includes acoustical test chambers, a Real-Ear Attenuation Test Facility (ANSI standard compliant), a semi-reverberant test chamber for simulating various Navy operational environments, and a high-level noise test chamber. In addition, equipment supporting analog and digital signal processing, speech analysis, spectral analysis, and radio voice communications monitoring is resident. The laboratory also houses unique equipment to design, fabricate, and test innovative hearing protective earcup.

**EQUIPMENT/FACILITIES (Continued)**

The SPATIAL DISORIENTATION LABORATORY capability is a unique national asset consisting of many one-of-a-kind research devices. The CORIOLIS ACCELERATION PLATFORM (CAP) is the only device worldwide capable of applying combined linear and angular acceleration to the human subject. It is also the only device in the DoD inventory available to study chronic exposure to altered G environments. The CAP is a combined linear and angular motion device, which utilizes two independently controlled power servomechanism drive systems to generate acceleration stimuli originated as a result of rotation about an Earth-vertical axis, and/or rectilinear translation along an Earth-horizontal axis. This device has enabled scientists to make accurate simulations of many bizarre combinations of force stimuli and their effects on aerospace crewmen under carefully controlled conditions. Data gathered by various studies utilizing the CAP continue to contribute significantly to the success of the space program and to the safety and well-being of the astronauts.

The PENDULAR INERTIAL GRAVITATIONAL (PIG) devices (PIG 1A and PIG 1B) are fixed on the CAP linear track and are used to position a human subject at various angles off from vertical z-axis while the CAP room is rotated. The PIGs can be oriented in four possible different directions.

The Vertifuge or DYNAMIC SIMULATOR (DYNASIM) was installed for research on spatial awareness. This device consists of three main components: A motion system, a visual surround for presentation of Earth-fixed or moving targets, and a computer-controlled system. The Vertifuge is currently being used to study pilot disorientation, which has been the direct cause of numerous accidents resulting in loss of life and hundreds of millions of dollars worth of aircraft.

The EQUITEST SYSTEM employs computerized dynamic posturography to systematically examine the effectiveness of visual, vestibular, and somatosensory inputs to balance and the timing, strength, and coordination of postural movements. This allows for evaluation of visual, vestibular, and somatosensory contributions to equilibrium.

The PATE DEVICE resembles a patient litter and is capable of rotating a subject about the longitudinal body axis and/or the horizontal axis through the pelvis. This apparatus has slip rings, which permit physiological monitoring, and is currently being used to study eye movement in response to rotation or perceived motion generated by moving patterns projected on a hemispheric screen in front of the subject.

The HUMAN DISORIENTATION DEVICE (HDD) is capable of accelerating an instrumented human subject about two head-centered axes simultaneously to help differentiate the relative roles played by the various sensory systems involved in the production of disorientation as well as to examine the contribution of each system and subsystem to motion sickness. The HDD is another instrument employed for studying the effects of disorientation caused by rotation and tumbling. The HDD differs substantially from the Pate device in that the axes of rotation can be made to pass through the intersection of the interaural and naso-occipital lines. It permits isolation and stimulation of specific portions of the organs of balance in the middle ear. This device has provided direct support for many basic and applied research projects sponsored by both the Navy and NASA.

**EQUIPMENT/FACILITIES (Continued)**

The OCULAR COUNTERROLL DEVICE is used to measure ocular counterroll in response to total body tilting movement and provide information on possible changes related to aging.

The OFF-VERTICAL-ROTATOR (OVR) is used to gain measures of semicircular canal and otolith function and related spatial orientation performance. The PERIODIC ANGULAR ROTATOR (PAR) is a novel servomotor designed for studies of the dynamic response of the vestibulo-ocular system. The PAR is a high-performance motion-inducing instrument that rotates a seated subject about the Earth-vertical axis in a wide variety of stimulus waveforms.

We have three ENVIRONMENTAL CHAMBERS, two are in adjacent rooms. One is 8x8 ft, and the other is 10 x 16 ft. The smaller room is used primarily for cold exposure with active temperature control from -5 to 25 C, and the larger room has active temperature control from 0 to 50 C. The third environmental chamber is a free-standing room 8 x 10 ft with precise temperature (0-60 C) and humidity (20-80%) control.

**MOBILE FIELD LABORATORIES**

This command has developed several MOBILE FIELD LABORATORIES to conduct specialized clinical and research tests evaluating the visual, vestibular, and auditory sensory systems. These tests, by virtue of the trailers mobility, permit our researchers to collect data at training bases, in the operational settings of the Marine Corps, and on board ships.

Naval Aerospace Medical Research Laboratory  
Pensacola, FL 32508-1046  
(904) 452-3287

Commander: CAPT J.C. Patee, MSC  
Chief Scientist: Dr. R. Stanny

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.082	NA	0.082
6.1 Other	0.478	0.057	0.535
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	1.326	0.076	1.402
6.3	1.735	0.042	1.777
<b>Subtotal (S&amp;T)</b>	<b>3.621</b>	<b>0.175</b>	<b>3.796</b>
6.4	0.000	0.000	0.000
6.5	1.049	0.296	1.345
6.6	0.295	0.175	0.470
6.7	0.000	0.000	0.000
Non-DOD	0.629	0.000	0.629
<b>TOTAL RDT&amp;E</b>	<b>5.594</b>	<b>0.646</b>	<b>6.240</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.000	0.000	0.000
Other	0.000	0.000	0.000
<b>TOTAL FUNDING</b>	<b>5.594</b>	<b>0.646</b>	<b>6.240</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	39	13	3	33
CIVILIAN	43	7	13	13
<b>TOTAL</b>	<b>82</b>	<b>20</b>	<b>16</b>	<b>46</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	36.591	<b>REAL PROPERTY</b>	2.966
ADMIN	26.516	* NEW CAPITAL EQUIPMENT	0.000
OTHER	56.714	<b>EQUIPMENT</b>	11.000
<b>TOTAL</b>	<b>119.821</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>3</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## Naval Air Warfare Center

## Abbreviated Functional Chart - Technical Organizations

## Naval Air Warfare Center

## Aircraft Division

- Antisubmarine Warfare Department
- Tactical Air Systems Department
- Warfare Systems Analysis Department
- Mission Avionics Technology Department
- Systems Software Technology Department
- Measurement Systems Department
- Air Vehicle and Crew Systems Technology Department
- Computer Sciences Directorate
- Force Warfare Aircraft Test Directorate
- US Naval Test Pilot School
- Range Directorate
- Strike Aircraft Directorate
- Systems Engineering Directorate
- Propulsion Engineering Directorate
- Systems Development Evaluation Department
- Science and Technology Department
- Avionic/Electronic Systems Fleet User Support Directorate
- Avionic/Electronic Systems Design Directorate
- Avionic Electronic System Acquisition & Manufacturing Directorate
- Test and Evaluation Group
- Programs Directorate
- In-Service Engineering Directorate
- Naval Air Station

## Training Systems Division

- Research and Technology Directorate
- Aviation Directorate
- USMC Directorate (Ground Program)
- Surface Directorate
- Undersea Directorate
- Battleforce Directorate
- Command Representatives for:  
CNET/COMNAVRESFOR  
Pacific  
Atlantic  
Washington, DC
- 40 In-Service Engineering Offices

## Weapons Division

- Aircraft Weapons Systems Directorate
- Weapons Directorate
- Weapons Systems Evaluation Directorate
- Sea Range Directorate
- Land Range Directorate
- Threat Simulation Directorate
- Naval Air Weapons Station
- Naval Weapons Evaluation Facility
- Naval Ordnance Missile Test Station

Naval Air Warfare Center  
Arlington, VA 22243  
(703) 604-6033

Commander: RADM W. E. Newman  
Technical Dir.: Lewis Lundberg

### MISSION

Our mission is to be the Navy's full spectrum research, development, test and evaluation, engineering, and fleet support center for air platforms, autonomous air vehicles, missiles and missile subsystems, weapons systems associated with air warfare, and for sensor systems used to conduct antisubmarine warfare from air platforms; and to be the principal Navy center for acquisition and product support of training systems.

### CURRENT IMPORTANT PROGRAMS

#### ANTI-AIR MISSILES:

Sidewinder, Sparrow, Phoenix, AMRAAM, Standard Missile.

#### ANTI-SURFACE WEAPONS:

High Speed Anti-Radar (HARM) Missile, Tomahawk, Skipper, Harpoon/SLAM, Joint Standoff Weapon (JSOW), Advance Rocket System (ARS), Joint Direct Attack Munitions (JDAM), Harpoon, Hellfire, Cruise Missile.

#### ELECTRONIC WARFARE:

Low Cost Seeker (LCS), Electronic Radiation Source Elimination (ERASE), EA-6B System, Radar Warning Receivers, TACAIR EW Electro-Optics and Infrared R&D.

#### AIRCRAFT SYSTEMS & TACTICAL AIRCRAFT SYSTEMS:

A-6, EA-6B, AV-8B, F/A-18, F/A-18EF, F-14, AH-1, H-60, V-22, E-2C, T-45TS, ES-3A, T800 (LNX) Engine Qualification Program, Unmanned Air Vehicle, Aircraft Materials, Crew Systems, Joint Tactical Information Distribution System (JTIDS), Airborne ASW Surveillance, Airborne Surveillance Systems.

#### TECHNOLOGY BASE:

Sensors/seekers (AIR, EO, RF) propulsion, warheads, guidance, fuzing, materials technology for weapons system development, Air-Combat Environment T&E Facility (ACETEF), IHPTET Program Management, Weapons and Aircraft Modeling and Analysis.

**CURRENT IMPORTANT PROGRAMS (Continued)****TRAINER PROGRAMS:**

Research and Technology development in Instructional Technology, Simulator Networking, Tactical Decision Making Under Stress, Embedded Training Technology, Deployable Training, Virtual Environmental Training, Sensor Simulation, Weapons Teams Simulation, Scenario Development, Simulator Sickness, Aircrew Coordination, and Software Technology for Adaptable Reliable Systems. Trainer acquisition programs for Marine Corps Ground, Aviation, Surface, Undersea and Battleforce Programs.

**OTHER:**

Aircraft Launch and Recovery Systems, Electronics Manufacturing Production Support Vessel Tracking System, propulsion/materials exploratory and advanced development product support, Targets and Simulators for Air-Launched Systems, Threat Simulator Development, Operation of Land and Sea Ranges.

**EQUIPMENT/FACILITIES****China Lake, CA:**

**ENCOUNTER SIMULATION LABORATORY (ESL):** The ESL is used by the Navy, Air Force, and Army for realistic fuze-target encounter simulations with scale models and full-scale targets using actual or model sensor hardware.

**EXPLOSIVES & PROPULSION LABORATORIES:** A complex of laboratories provides facilities for research in the fundamentals of propellant and explosives technology.

**FULL-SCALE SURVIVABILITY & VULNERABILITY FACILITY:** This facility provides the capability to test and evaluate the vulnerability and lethality of air systems through full-scale live-fire testing and computer simulations.

**FUZE AND SENSORS LAB:** Project provides consolidated engineering laboratory space for air-to-air, air-to-surface, and surface-to-air and fuze and sensor research, development, test, and evaluation in direct support of NAWCWPNS Assigned Programs.

**INFORMATION & ELECTRONIC WARFARE (I&EW) SYSTEMS LABORATORIES:** The various NAWCWPNS I&EW systems laboratories provide life-cycle support for airborne EW systems, including warning receiver, jammer, EO/IR, missile-warning, countermeasures, and support systems; software support for the EA-6B aircraft as well as for prime multi-platform EW systems; and system engineering support, including system design and integration, development of information systems, and fleet system software upgrades for warning, jamming, and decoy systems.

**EQUIPMENT/FACILITIES (Continued)**

**SIMULATIONS:** Extensive simulation capabilities supporting weapons design and development include six-degree-of-freedom hardware-in-the-loop (HWIL) facilities.

Other facilities include Michelson Laboratory, Lauritsen Laboratory, EW Threat Environment Simulation Facility (EWTES), solid-state laboratory, microelectronics facility, explosives R&D facility, weapons evaluation range, military targets range, Armitage Field, parachute test facilities, supersonic test tracks, microwave anechoic facilities, RF and IR/EO hardware-in-the-loop simulations.

**Point Mugu, CA:**

**AIR WARFARE EVALUATION FACILITY:** A 121,000 square-foot missile systems evaluation laboratory which can perform secure missile-in-the-loop seeker-performance testing under simulated operational conditions and against high-fidelity target presentations.

**MISSILE & AIRCRAFT SOFTWARE VALIDATION & TESTING LABORATORIES:** Laboratories are available to support independent software verification and validation and performance testing.

**RELIABILITY & PRODUCT ASSURANCE TEST LABORATORIES:** Operates and maintains the full spectrum of combined environmental and reliability test facilities. These facilities support tactical aircraft weapon systems, inert and all-upround missiles, target and unmanned air vehicle systems, rocket motors, and electronic systems and components.

**WEAPON SYSTEM INSTRUMENTATION & DATA ANALYSIS:** These facilities support weapons-testing instrumentation requirements related to tactical missiles, aircraft, and other product areas. The data analysis laboratories provide near-real-time data extraction and evaluation for timely assessment of aircraft/weapon integration and missile system performance.

Other facilities include ground, air and sea ranges, weapons and tactics analysis center, aircraft weapons survival laboratory, aircraft integration/simulation facilities, strategic systems T&E facility, and radar cross-section facility.

**Patuxent River Station, MD:**

Facilities include: RDT&E hangars, aircraft maintenance facilities, catapult launch system, landing systems test facility, automatic carrier landing system, marine air traffic control, Chesapeake Test Range, range EW and flight radar cross-section facility, aircraft electrical and environmental evaluation facility, antenna and avionics test facility, ship ground station helo-ship data link evaluation facility, Air Combat Environmental T&E facility (ACETEF), manned flight simulator, EW integrated systems test lab, anechoic chamber, electromagnetic environmental effects facility, EW closed loop facility, target support facility.

**Training Systems Division, Orlando, FL**

Facilities include 281,000 square feet of office, laboratory and support space on 40 acres of land adjacent to the University of Central Florida.

**EQUIPMENT/FACILITIES (Continued)****Trenton, NJ:**

Facilities include: large and small engine altitude test area, large engine sea level test cells, rotor spin facility, fuel and lubricants facility, helicopter transmission test facility.

**Warminster, PA:**

Facilities include: VP/VS and Lamps Facilities, carrier ASW module lab, ASW engineering lab, vertical flight lab, air common acoustic processor lab, ASW mission planning lab, TACAIR combat training systems facility, TACAIR mission planning and systems development facilities, systems integration lab, sonar development simulation facility, dynamic flight simulator, vertical decelerator, ejection seat tower, environmental physiology lab, Navy standard signal processor lab, and open water test facility..

**Lakehurst, NJ:**

Facilities include: TC13 MOD 0 and TC 13 MOD 2 Steam Catapult; MK-7 MOD 2 and MK-7 MOD 3 arresting gear; 12,000 ft test runway dedicated to aircraft launch and recovery equipment development; elevated fixed platform with installed Recovery, Assist, Securing and Traversing (RAST) system; three (3) active jet car test tracks; jet blast deflector site; support equipment test course and Universal Lighting Pad (UPL).

**Indianapolis, IN:**

Computer Aided Design (CAD) equipment, Computer Aided Manufacturing (CAM) equipment, digital avionics simulation laboratory, mobile navigation/communication lab, mission planning center, integrated avionics lab, ASW lab, microwave integrated circuits lab, EP-3/ES-3 integrated test facility, meteorological satellite recovery systems lab, microwave test range, design/development environmental test equipment, engineering design lab, materials lab, stereo lithography equipment, failure analysis equipment, scanning electron microscopes, model analysis equipment.

Naval Air Warfare Center  
Arlington, VA 22243  
(703) 604-6033

Commander: RADM W. E. Newman  
Technical Dir.: Lewis Lundberg

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	2.521	NA	2.521
6.1 Other	4.679	1.194	5.873
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	53.501	31.897	85.398
6.3	37.300	50.761	88.061
<b>Subtotal (S&amp;T)</b>	<b>98.001</b>	<b>83.852</b>	<b>181.853</b>
6.4	93.661	61.837	155.498
6.5	195.569	404.104	599.673
6.6	186.072	179.391	365.463
6.7	89.208	64.658	153.866
Non-DOD	1.129	18.104	19.233
<b>TOTAL RDT&amp;E</b>	<b>663.640</b>	<b>811.946</b>	<b>1,475.586</b>
Procurement	563.746	913.588	1,477.334
Operations & Maintenance	360.551	399.088	759.639
Other	373.686	457.363	831.049
<b>TOTAL FUNDING</b>	<b>1,961.623</b>	<b>2,581.985</b>	<b>4,543.608</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	78.953

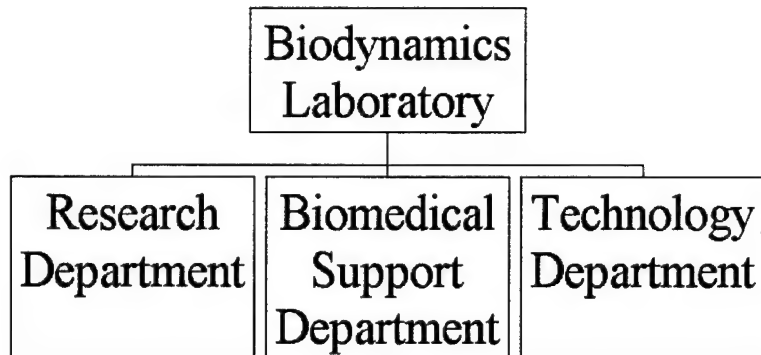
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	3,203	6	319	2,878
CIVILIAN	19,185	265	7,005	11,915
<b>TOTAL</b>	<b>22,388</b>	<b>271</b>	<b>7,324</b>	<b>14,793</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	10,133.082	<b>REAL PROPERTY</b>	1,701.438
ADMIN	2,054.708	* NEW CAPITAL EQUIPMENT	38.125
OTHER	12,377.705	<b>EQUIPMENT</b>	1,443.603
<b>TOTAL</b>	<b>24,565.495</b>	* NEW SCIENTIFIC & ENG. EQUIP.	81.923
<b>ACRES</b>	<b>1,145,461</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

Naval Biodynamics Laboratory

Abbreviated Functional Chart - Technical Organizations



**Naval Biodynamics Laboratory**  
New Orleans, LA 70189-0407  
(504) 257-3947

Commander: CDR R. W. Rendin, MSC  
Chief Scientist: Dr. Marc Weiss

### MISSION

To be the principal Navy activity to conduct biomedical research on the effects of mechanical forces (motion, vibration, and impact) encountered in ships and aircraft on naval personnel; to establish human tolerance limits for these forces; and to develop preventive and therapeutic methods to protect personnel from the deleterious effects of such forces.

### CURRENT IMPORTANT PROGRAMS

Determination of Human Dynamic, Injury and Performance Response to Impact Acceleration and Development of Validated Manikin Components.

Protection of Naval Personnel from Adverse Effects of Ship Motion.

### EQUIPMENT/FACILITIES

The Naval Biodynamics Laboratory (NBDL) is one of the eight laboratories under the Naval Medical Research and Development Command, headquartered in Bethesda, Maryland. NBDL is the primary Navy command conducting biomedical research on the effects of mechanical forces, establishing human tolerance limits to these forces and developing approaches to minimize their adverse effects. NBDL has several unique man-rated test devices which include:

#### HORIZONTAL ACCELERATOR

A nitrogen powered horizontal accelerator capable of delivering 225,000 lbs of thrust propelling a payload along a 200 meter indoor track.

Max. acceleration	140g
Max. payload	5000lbs
Max. velocity	150 ft/sec
Power stroke	9.84 ft
Pulse shape	half-sine, modified square trapezoidal
Pulse duration	.200 sec
Track length	700 ft
Sled dimensions	12 ft x 4 ft
Data acquisition	16 channel FM (telemetry), 28 channel digital

**EQUIPMENT/FACILITIES (Continued)****VERTICAL ACCELERATOR**

A nitrogen powered vertical accelerator capable of delivering 40,000 lbs of thrust with a 13 meter maximum range.

Max. acceleration	75g
Max. payload	1500 lbs
Max. velocity	65 ft/sec
Power stroke	3.5 ft
Pulse shape	half-sine, triangular trapezoidal
Pulse duration	.200 sec
Height	36 ft
Carriage dim.	2.5 x 6 ft
Data acquisition	16 channel FM (telemetry), 28 channel digital

**SHIP MOTION SIMULATOR**

The Navy's only ship motion simulator capable of simulating ship motions with three degrees of freedom.

Degrees of freedom	3 (heave, pitch, roll)
Heave stroke length	22 ft
Heave freq. response	0.04 to 4.0 Hz
Angular displacement	30 degrees, pitch and roll
Angular velocity	25 degrees/sec, pitch and roll

**TRI-AXIAL TILT ROTATION CHAIR**

A three axis tilting/rotating motion chair.

Rotation	Variable up to 20 RPM, clockwise or counterclockwise
Pitch and roll	Total range of 80 degrees (+/- 40 deg)

**ELECTROHYDRAULIC SHAKER**

A vertical electrohydraulic shaker with a 500 pound, +/- 15 centimeter stroke capacity.

Frequency response	1 to 500 Hz
Stroke length	12 in
Payload capacity	500 lbs

Naval Biodynamics Laboratory  
 New Orleans, LA 70189-0407  
 (504) 257-3947

Commander: CDR R. W. Rendin, MSC  
 Chief Scientist: Dr. Marc Weiss

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	0.000	0.000	0.000
6.3	0.602	0.398	1.000
<b>Subtotal (S&amp;T)</b>	<b>0.602</b>	<b>0.398</b>	<b>1.000</b>
6.4	2.112	1.655	3.767
6.5	0.000	0.000	0.000
6.6	0.000	0.291	0.291
6.7	0.000	0.000	0.000
Non-DOD	0.112	0.000	0.112
<b>TOTAL RDT&amp;E</b>	<b>2.826</b>	<b>2.344</b>	<b>5.170</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.000	0.000	0.000
Other	0.000	0.000	0.000
<b>TOTAL FUNDING</b>	<b>2.826</b>	<b>2.344</b>	<b>5.170</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

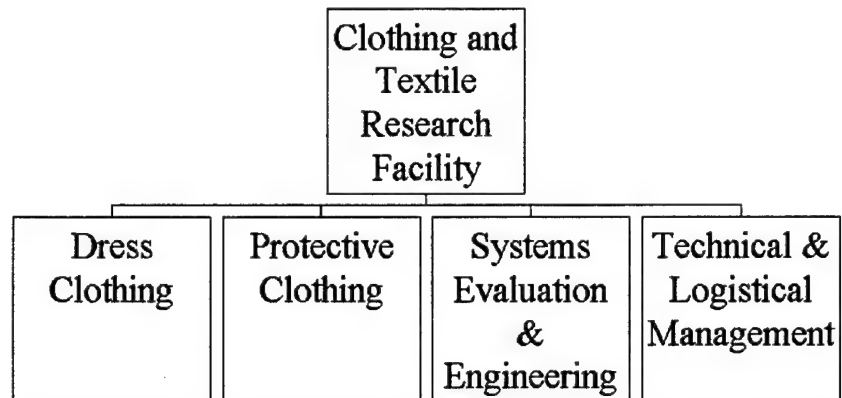
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	19	3	3	13
CIVILIAN	34	3	12	19
<b>TOTAL</b>	<b>53</b>	<b>6</b>	<b>15</b>	<b>32</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	25.845	<b>REAL PROPERTY</b>	2.263
ADMIN	27.907	* NEW CAPITAL EQUIPMENT	0.000
OTHER	0.000	<b>EQUIPMENT</b>	4.727
<b>TOTAL</b>	<b>53.752</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.270
<b>ACRES</b>	<b>2</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## Navy Clothing and Textile Research Facility

## Abbreviated Functional Chart - Technical Organizations



**Navy Clothing and Textile Research Facility**  
Natick, MA 01760-0001  
(508) 651-4172

Commander: CDR K. T. Adams  
Technical Dir: Barbara A. Avellini, Ph.D

### MISSION

Conduct research, development, test and evaluation and provide engineering support in clothing, textiles, and related fields associated with service clothing and environmental protective clothing.

### CURRENT IMPORTANT PROGRAMS

The five most important research programs at this Facility are:

1. Joint Services Lightweight Integrated Suit Technology (JSLIST) which is a joint service program to develop a garment which will be protective in chemical-biological contaminated environments and can be used in one form or another by all services.
2. Non-Development Items Program is designed to provide state-of-the art, commercially available, firefighter's protective clothing, flame resistant utility uniforms, anti-exposure suits, cold and wet weather ensembles and life-support systems and equipment for Navy personnel which meet appropriate performance requirements for the shipboard environment. Performance requirements/testing procedures are developed at NCTRF to enable commercial products to be qualified through NCTRF laboratory testing and Fleet evaluation. Testing includes conformance to standards and Navy unique requirements designed to analyze the protective capabilities of materials and clothing.
3. Electrochemical Compressor - New technology to power a personal microclimate cooling system which will result in lower weight and more efficient cooling capacity.
4. Phase Change Finishes - New technology which will be used to extend the range of comfort for individuals exposed to warm and cold environments, as well as to enhance the performance of protective clothing. This technology can also be useful to the private sector.
5. The Air Force Fire Fighters Hazmat Ensemble is a program to develop technology for a totally integrated fire fighters ensemble for protection against fire and hazardous materials. No such protection currently exists. This ensemble can also be used by the private sector.

**EQUIPMENT/FACILITIES**

1. The Thermal Manikin system is used to measure insulation values of protective clothing in both an air and a water immersion environment. Data obtained are used with simulation models to determine tolerance times to various combinations of work, clothing, and environmental conditions. This is one of only four known manikins worldwide capable of being used in both water and air.
2. The Thermal Hand and Thermal Foot are used to measure insulation values of handwear and footwear, respectively. The Hand and Foot have 9 and 27 independently controlled sections, respectively, which permit more detailed analysis of regional insulation. Worldwide, there are only three other known thermal hands and one other known thermal foot.
3. The Environmental Test Chamber reproduces extremes from -40°F to 130°F at 5% to 95% relative humidity, with wind speeds up to 25 mph. The chamber is used for physiological and biophysical research, test, and evaluation.
4. The Hydro-Environmental Simulator is an integrated air and water chamber whose temperatures are controlled independently. The simulator is used to evaluate anti-exposure suits and buoyancy properties of equipment, using the thermal manikin and human test volunteers. This is the only known chamber within the Navy that is able to independently control both air and water temperatures simultaneously, and thus simulate any air/water interface.
5. The Clothing pattern design and cutting computer system is used to design clothing patterns, and to grade and cut the patterns for each of the clothing sizes required.
6. The Shipboard laundry is used to perform research, development, test, and evaluation on the laundering and chemical effects on fabrics and clothing.
7. The Thermal Flammability Laboratory contains various types of test apparatus to evaluate the effects on fabrics of thermal energy in the form of flame, and of conductive, convective, and infrared radiant heat.
8. Physiological test and evaluation equipment.
9. Physical test equipment such as Instron Testers, Weatherometers, Fadeometers, Launderometer, tear testers, tensile tester, stiffness tester, hydrostatic tester, etc. are used to determine the physical characteristics of clothing and textiles.
10. The NCTRF traversing thermocouple instrumented manikin is used to evaluate fire resistant protective clothing at variable heat flux levels and exposure times, when exposed to a propane fueled fire in an enclosed area. The data obtained by the thermocouple sensors are transported to another program which predicts the burn injury potential that an individual wearing the tested garment would have incurred.

Navy Clothing and Textile Research Facility  
 Natick, MA 01760-0001  
 (508) 651-4172

Commander: CDR K. T. Adams  
 Technical Dir: Barbara A. Avellini, Ph.D

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	0.408	0.300	0.708
6.3	0.792	0.218	1.010
<b>Subtotal (S&amp;T)</b>	<b>1.200</b>	<b>0.518</b>	<b>1.718</b>
6.4	0.118	0.012	0.130
6.5	0.000	0.000	0.000
6.6	0.000	0.000	0.000
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>1.318</b>	<b>0.530</b>	<b>1.848</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	1.900	0.657	2.557
Other	0.010	0.000	0.010
<b>TOTAL FUNDING</b>	<b>3.228</b>	<b>1.187</b>	<b>4.415</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

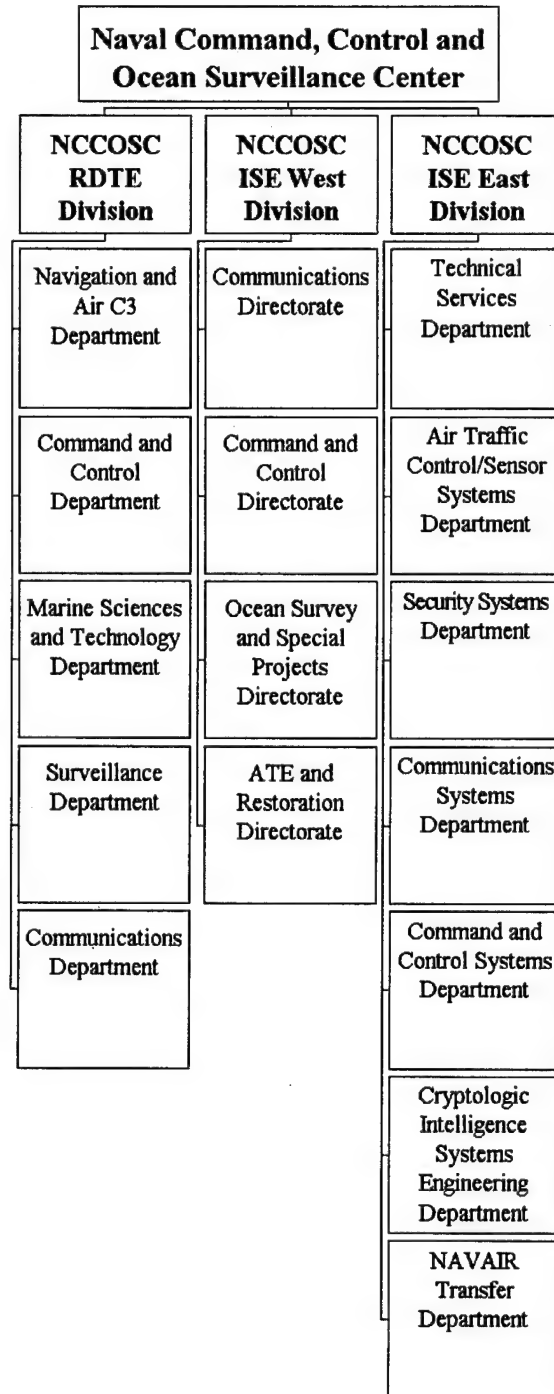
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	1	0	1	0
CIVILIAN	53	1	32	20
<b>TOTAL</b>	<b>54</b>	<b>1</b>	<b>33</b>	<b>20</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	12.667	<b>REAL PROPERTY</b>	0.000
ADMIN	16.000	* NEW CAPITAL EQUIPMENT	0.000
OTHER	5.630	<b>EQUIPMENT</b>	1.441
<b>TOTAL</b>	<b>34.297</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.042
ACRES	0	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## Naval Command, Control and Ocean Surveillance Center

## Abbreviated Functional Chart - Technical Organizations



**Naval Command, Control and Ocean Surveillance Center**

San Diego, CA 92147-5088  
(619) 553-9740

CO (acting): CAPT George Klein  
Tech. Director: Paul Wessel

**MISSION**

To be the Navy's full spectrum research, development, test and evaluation, engineering and fleet support center for command, control and communications systems and ocean surveillance and the integration of those systems which overarch multiplatforms. Leadership areas: Command, Control and Communication Systems; Command, Control and Communication Systems Countermeasures; Ocean Surveillance Systems; Command, Control and Communication Modeling and Analysis; Ocean Engineering; Navigation Support; Marine Mammals; Integration of Space Communication and Surveillance Systems.

**CURRENT IMPORTANT PROGRAMS**

SHF/EHF/UHF Satellite Communications. VLF Communications. Caribbean Regional Operations Center. Air Traffic Control. Submarine Electronic Support Measures. Hierarchical Yet Dynamically Reprogrammable Architecture (HYDRA). Relocatable Over the Horizon Radar. Naval Tactical Command Support System. Royal Saudi Naval Forces C3 Upgrade. Global Positioning System. Joint Tactical Information Distribution System. Multifunctional Information Distribution System. Advanced Combat Direction System Block 0 and Block 1. Joint Maritime Command Information System. Global Command and Control System. Command and Control Processor. Combat ID Systems Development. Marine Mammal Systems. Consolidated Cryptologic Program. Tactical Receive Equipment (TRE)/TRE Related Applications. Multimission Advanced Tactical Terminal/Prototype Information Correlation Exploitation System. Surveillance Towed Array Sensor System. Advanced Deployable System. Fixed Distribution System. Communications Support System. Theater Missile Defense. Submarine Communications.

**EQUIPMENT/FACILITIES**

The Naval Command, Control and Ocean Surveillance Center (NCCOSC) maintains over 120 major facilities in support of the warfare center mission. Special purpose test beds, simulators, laboratories, calibration facilities and repair shops support development, engineering, prototyping, integration, installation, test, and life cycle support of the command, control, communication and surveillance systems for which NCCOSC is responsible. Some of the unique or special interest facilities are listed below by location.

**EQUIPMENT/FACILITIES (Continued)****RDT&E Division, San Diego, CA:**

High Performance Computing Laboratory providing a wide range of advanced computer systems for the scientific investigation of next-generation architecture. Microelectronics laboratory and production line for products unavailable commercially. Research, Evaluation and Systems Analysis (RESA) facility, a large-scale computer-based simulation/wargaming system used to support a variety of applications, including C3I architecture assessment, concept of operations development, advanced technology evaluation, joint exercises, and test and evaluation of advanced systems. AN-YUK and CONVEX computers.

**RDT&E Division Detachment, Warminster, PA:**

High-accuracy navigation sensor laboratory, housed in a specially constructed 155-ft-diameter building that provides the capability to conduct extremely high-stability long-term R&D investigations of new technology sensors including ring laser, fiber-optic, and superconducting gyros. Simulated Ships Motion Facility (SCORSBY), a 4,000 sq. ft. facility housing three large ship motion simulators that have the capacity to accommodate navigation systems weighing up to 3,000 lbs, designed to apply controlled roll, pitch, and heading motions to new technology navigation systems, and incorporate the capability for high-accuracy dynamic readouts for strategic and tactical applications.

**NISE West, San Diego, CA:**

Tactical Systems Support Complex, a Sensitive Compartmented Information facility supporting electronic support measures systems. Global Positioning System Test Facility, the only DoD facility capable of complete AN/WRN-6 system testing. Outboard Calibration Facility, the only West Coast signal generation site designed to provide controlled stimulus to OUTBOARD (AN/SSQ-108(V)) ships to calibrate direction finding capability. Cryptologic Repair Facility supports all Navy cryptographic equipment world-wide. Radioactive Detection Indication and Calibration (RADIAC) equipment repair and calibration lab. Automatic Test Equipment Software Center for testing and screening the most sophisticated DoD electronic equipment and systems. Mobile Tactical Systems Maintenance and Test Facility. San Diego Depot, an industrial facility providing DoD, Navy and multiservice depot level support for electronic systems of all levels of sophistication.

**NISE East Detachment, St. Inigoes, MD:**

Electromagnetic Interference/Electromagnetic Environmental Effects/TEMPEST Facility, a fully instrumented facility providing for the development and testing of MIL-STD-460 series test procedures and applications. Communication, Integration, and Test Laboratory supports the integration, installation and test of Radio Communication Systems (RCSs) for the AEGIS CG 47 and DDG 51 class shipbuilding programs. Shipboard Communications Integration Facility used for on-the-job training of ships' crews on the AEGIS RCSs, the Single Audio System, and other fleet training projects. AEGIS Satellite Production Test Center houses seven test beds for the AEGIS RCS production and has RCS mockups for the CG 47 and DDG 51 class shipbuilding programs.

**EQUIPMENT/FACILITIES (Continued)****NISE East Detachment, Portsmouth, VA:**

Command Systems Test Facility containing state-of-the-art equipment used to evaluate, test and provide direct fleet support for C4 systems, and includes complete NTCS-A and NCCS-Ashore system suites, communication interfaces, and on-line secure tactical communications capabilities (TADIXS/OTCIXS). Surveillance Engineering Center housing systems and equipment test beds in support of Submarine and Surface Electronic Warfare, Surveillance, and Shipboard Cover and Deception (SCADS) programs.

**NISE East, Charleston, SC:**

AN/GPN-27 Radar Site, an Air Traffic Control ASR-8 Radar that is an operational Airport Surveillance Radar providing for modification, PITCO, and standardization testing. Simulator and Software Support Facility for equipment necessary to provide lifecycle support for strategic submarine comm. systems, housing four unique and diverse security systems representing equipment deployed at naval shore sites.

## Naval Command, Control and Ocean Surveillance Center

San Diego, CA 92147-5088

(619) 553-9740

CO (acting): CAPT George Klein

Tech. Director: Paul Wessel

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	2.308	NA	2.308
6.1 Other	3.107	3.282	6.389
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	35.257	54.039	89.296
6.3	25.671	67.512	93.183
<b>Subtotal (S&amp;T)</b>	<b>66.343</b>	<b>124.833</b>	<b>191.176</b>
6.4	31.196	29.104	60.300
6.5	40.788	48.160	88.948
6.6	8.488	8.153	16.641
6.7	44.997	52.899	97.896
Non-DOD	0.050	0.000	0.050
<b>TOTAL RDT&amp;E</b>	<b>191.862</b>	<b>263.149</b>	<b>455.011</b>
Procurement	393.636	690.073	1,083.709
Operations & Maintenance	189.741	242.235	431.976
Other	120.060	192.714	312.774
<b>TOTAL FUNDING</b>	<b>895.299</b>	<b>1,388.171</b>	<b>2,283.470</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	4.636

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	189	3	33	153
CIVILIAN	5,050	198	2,339	2,513
<b>TOTAL</b>	<b>5,239</b>	<b>201</b>	<b>2,372</b>	<b>2,666</b>

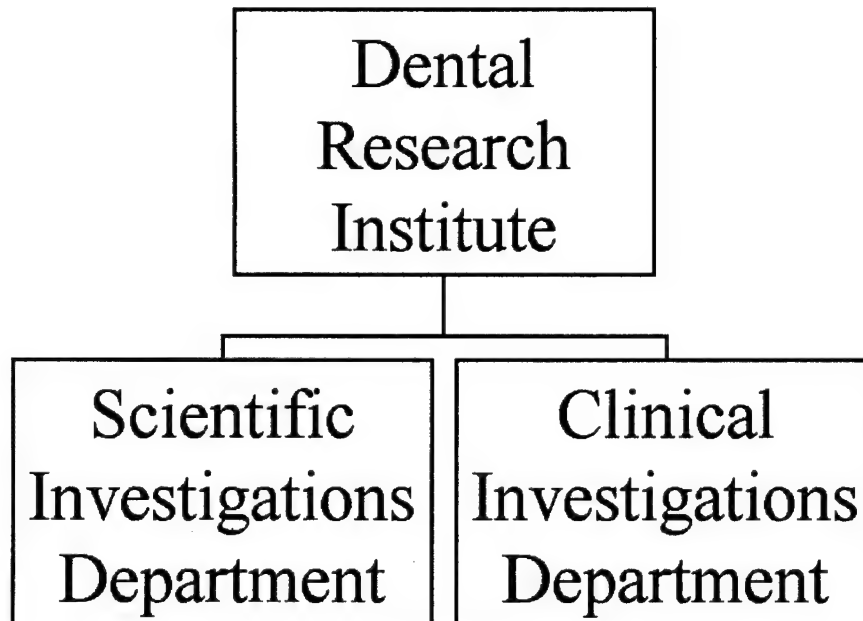
SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	2,715.800	<b>REAL PROPERTY</b>	229.300
ADMIN	644.700	* NEW CAPITAL EQUIPMENT	13.200
OTHER	1,446.300	<b>EQUIPMENT</b>	193.400
<b>TOTAL</b>	<b>4,806.800</b>	* NEW SCIENTIFIC & ENG. EQUIP.	14.600
<b>ACRES</b>	<b>3,709</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Naval Dental Research Institute

Abbreviated Functional Chart - Technical Organizations



**Naval Dental Research Institute**  
Great Lakes, IL 60088-5259  
(708) 688-5647

Commndng Offcr: CAPT Stephen A. Ralls, DC  
Exec. Officer: CAPT D.M. Meyer, DC

### **MISSION**

To research, develop, test, and evaluate new methods and materials that limit oral disease, reduce dental emergencies, maximize operational readiness, and promote dental wellness for Navy and Marine Corps personnel.

### **CURRENT IMPORTANT PROGRAMS**

Current Important Programs: Our research program is divided into eight current objectives:

- Develop Rapid Chairside Dental Diagnostics
- Develop a Radiographic System to Identify Dental Disease Progression
- Develop a Navy-wide Managed Dental Care Delivery System
- Compile and Analyze Dental Epidemiologic Data
- Demonstrated host-response factors as disease models
- Multi-media remote site diagnostic system
- Develop a Risk Assessment Program
- Develop Advanced Imaging of Pathologic Conditions with applied 3D computer visualization

**EQUIPMENT/FACILITIES**

- 44,235 square feet AAALAC-accredited animal colony
- A comprehensive dental research library, numerous volumes and journals with direct MEDLINE access
- Electron microscope capability
- Extensive computer and data processing facilities
- Direct access to large military populations and the Navy's only Recruit Training Center
- Direct access to the American Dental Association, three university dental schools, a large VA hospital, a large Naval Hospital, a major Naval Dental Center, and the headquarters of
- nearly 50 leading dental organizations
- A gas chromatography microbial identification system
- Numerous other state-of-the art equipment
- Direct access to the National Institute of Dental Research, National Library of Medicine, the National Institute of Standards and Technology, and National Institutes of Health (NDRI Bethesda detachment)

Naval Dental Research Institute  
Great Lakes, IL 60088-5259  
(708) 688-5647

Commndg Offcr: CAPT Stephen A. Ralls, DC  
Exec. Officer: CAPT D.M. Meyer, DC

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.207	NA	0.207
6.1 Other	0.000	0.163	0.163
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	0.000	0.000	0.000
6.3	0.533	0.358	0.891
<b>Subtotal (S&amp;T)</b>	<b>0.740</b>	<b>0.521</b>	<b>1.261</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	0.640	0.000	0.640
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>1.380</b>	<b>0.521</b>	<b>1.901</b>
Procurement	0.238	0.000	0.238
Operations & Maintenance	0.000	0.000	0.000
Other	0.000	0.000	0.000
<b>TOTAL FUNDING</b>	<b>1.618</b>	<b>0.521</b>	<b>2.139</b>

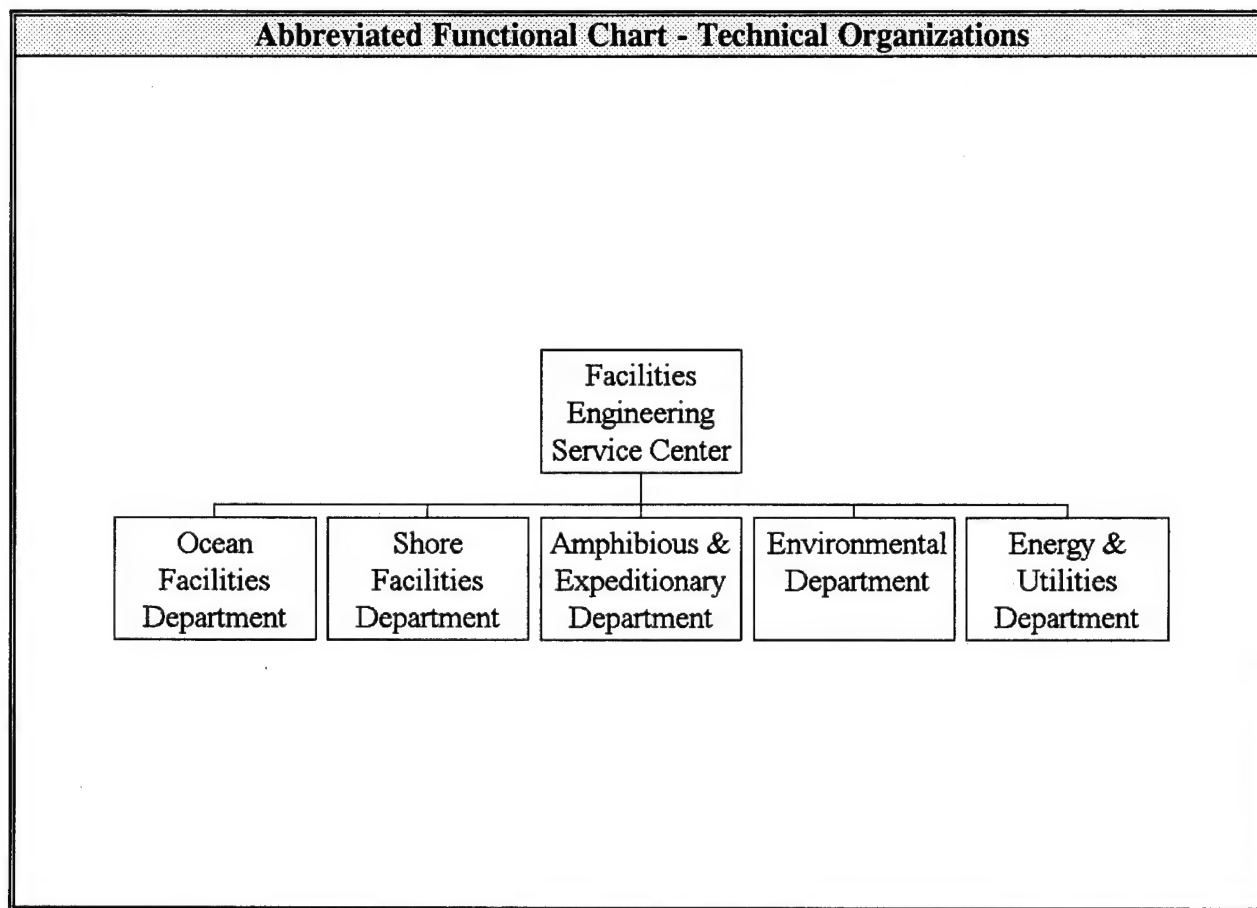
MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	27	10	0	17
CIVILIAN	11	4	2	5
<b>TOTAL</b>	<b>38</b>	<b>14</b>	<b>2</b>	<b>22</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	21.264	<b>REAL PROPERTY</b>	5.000
ADMIN	6.001	* NEW CAPITAL EQUIPMENT	0.000
OTHER	9.318	<b>EQUIPMENT</b>	1.876
<b>TOTAL</b>	<b>36.583</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.140
<b>ACRES</b>	<b>0</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## Naval Facilities Engineering Service Center



**Naval Facilities Engineering Service Center**

Port Hueneme, CA 93043-4328

(805) 982-1393

Commanding Officer: CAPT J.P. Collins

Dir. Business Op: Robert N. Cordy

**MISSION**

As an integral member of the Naval Facilities Engineering Command Team, our mission is to provide specialized engineering, scientific, and technical products and services on a worldwide basis in areas of shore, ocean and waterfront facilities, amphibious and expeditionary operations, energy and utilities, and environmental engineering. The services provided include research, consulting, and field engineering for Navy, Marine Corps, DoD customers and other Federal Agencies.

As a service organization, we are committed to providing our customers with quality products and services they need in the shortest possible time at the lowest possible cost. The entire range of products and services are structured to compliment the missions and capabilities of the rest of the NAVFAC team.

**CURRENT IMPORTANT PROGRAMS**

Tri-Service RELIANCE performer for Ocean and Waterfront Facilities/Operations. Defense Environmental Restoration Program. National Test Site. Pollution prevention. Navy shore facilities improvement. Deep ocean technology. Marine Corp. amphibious logistics and expeditionary operations. Navy construction forces systems. Underwater construction force systems. Explosive safety. Physical security systems. Energy Conservation. Support of Army and Air Force facilities engineering programs.

**EQUIPMENT/FACILITIES**

Advanced Waterfront Technology Test Site - this half scale 120 foot long pier test platform is only such facility in the US. Used to simulate lateral and static loads for evaluating structural components of various pier designs. Composites substitution for traditional steel, concrete members technology validation transfer is performed at test site.

**EQUIPMENT/FACILITIES**

**Deep Ocean Simulation Laboratory-** This largest facility on the West Coast contains 12 pressure vessels capable of simulating the deep ocean environment under controlled conditions. It is used for certifying fleet hardware and support technology validation and testing. Test facilities and services are rented to industry.

**Shallow Water Dive Tank-** A 30 ft diameter , 65,000 gallon seawater tank for testing oceanographic equipment, diver construction techniques, diver tools and underwater NDT equipment.

**Motor Vessel "Independence"-** A 200 ft vessel outfitted to support ocean engineering research and undersea equipment validation testing. The M.V. has an internal wet well and crane system for installation and retrieval of underwater systems.

**Ballistic Test Facility -** Test site for evaluating security products and structural impediments to delay or overcome forced entry to buildings.

**Environmental Protection Laboratory-** facility supports laboratory studies needing GC/MS, GC, Microtox evaluations.

**High Temperature Pavements Test Facility -** Controlled high temperature blast facility which simulates the jet blast of an aircraft auxiliary power unit. Used to test concrete mixtures from the effects of blasts from F-18s, B-1s and AV-8Bs.

**Diver Support Vessel -** A 49 foot vessel having a range of 300NM supporting nearshore efforts such as ROV operations, seafloor instrumentation and deployment and associated diving operations. Controlled suspension test facility, recompression chamber, cold chamber.

**Line/Cable Testing Facility -** An 80 ft test site that applies static loads up to 200,000lb or cyclic loads up to 100,000 lb wire ropes, synthetic lines, and electromechanical cables.

**Controlled Suspension Test Fixture -** This 100 ft by 50 ft by 3 ft deep one-of-a-kind facility provides specialized survivability testing of full-sized seafloor cabling in an flowing water environment.

**Tilt Table/Static Pull Facility -** Center of gravity/stability testing and helicopter lift certification for equipment of up to 50 tons.

**Seawater Test Facility -** Test site for development , test and evaluation of seawater desalination equipment and expeditionary water treatment devices for production of potable water.

**Cold Test Chamber -** Environmental chamber for testing equipment down to -50 degrees.

**Battery Laboratory -** This facility was originally equipped to support testing and evaluation of batteries for the Deep Submergence Rescue Vehicle under simulated ocean conditions in conjunction with the pressure vessels of the Deep Ocean Laboratory. Large battery chargers, load banks, cell

**EQUIPMENT/FACILITIES**

monitoring voltage scanners, electrolyte handling equipment are used to conduct tests of silver-zinc batteries for the Navy's deep submergence vessels.

Flexor Test Stand - Computer controlled test rig capable of applying cyclical test loads of up to 300,000 lbs for dynamic barge loading tests of Flexor Pontoon connectors.

Fiber Optics Laboratory - A 2000 sq ft facility with temperature controlled cleanrooms for preparing glass optical fibers for precision optical measurements.

Geotechnical Modeling Test Facility - The only Navy facility for controlled testing involving dragging of implements through soils at metered rates and for monitoring soil behavior. The facility is used for testing model anchors, site assessment tools, cable plows, and other implements for penetrating the seafloor.

Seafloor Soils Laboratory - A 1000 sq ft facility for classifying and determining the engineering properties of seafloor soil samples for use in foundation and anchor design.

Soil Test Bed - A 60 ft long, 4 ft wide by 4 ft deep concrete flume for testing model anchors, plows, or other seafloor impedimenta.

Advanced Energy Utilization Test Bed - This facility is designed for use in evaluating integrated energy research efforts including solar heating systems, wind power, heating, ventilation and air conditioning equipment, construction materials and techniques, lighting, and infra-red heating, heat flux and infiltration.

Mobile Test Bed - All terrain tracked vehicle which can reach speeds of 50mph, providing up to 50,000-lb draw bar pull, while delivering 300 hp through an auxiliary hydraulic power unit. Used for evaluating the mobility of construction and material handling equipment on various surfaces and slopes.

Modular Barge System - This is a 12 pontoon modular barge that has been outfitted with Flexor connectors and waterjet propulsion. The pontoons can be connected in a number of configurations to form platforms as large as 120 feet by 24 feet. The setup can make as much as 8 knots underway and can be driven hard aground on sandy beaches without damage.

Naval Facilities Engineering Service Center  
 Port Hueneme, CA 93043-4328  
 (805) 982-1393

Commdng Offer: CAPT J.P. Collins  
 Dir.Business Op: Robert N. Cordy

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.461	0.116	0.577
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	5.280	0.637	5.917
6.3	10.831	3.075	13.906
<b>Subtotal (S&amp;T)</b>	<b>16.572</b>	<b>3.828</b>	<b>20.400</b>
6.4	9.935	2.540	12.475
6.5	2.628	0.254	2.882
6.6	0.067	0.000	0.067
6.7	1.088	0.031	1.119
Non-DOD	3.977	0.551	4.528
<b>TOTAL RDT&amp;E</b>	<b>34.267</b>	<b>7.204</b>	<b>41.471</b>
Procurement	4.025	12.507	16.532
Operations & Maintenance	21.574	10.545	32.119
Other	29.781	18.695	48.476
<b>TOTAL FUNDING</b>	<b>89.647</b>	<b>48.951</b>	<b>138.598</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.639

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	20	0	13	7
CIVILIAN	531	22	306	203
<b>TOTAL</b>	<b>551</b>	<b>22</b>	<b>319</b>	<b>210</b>

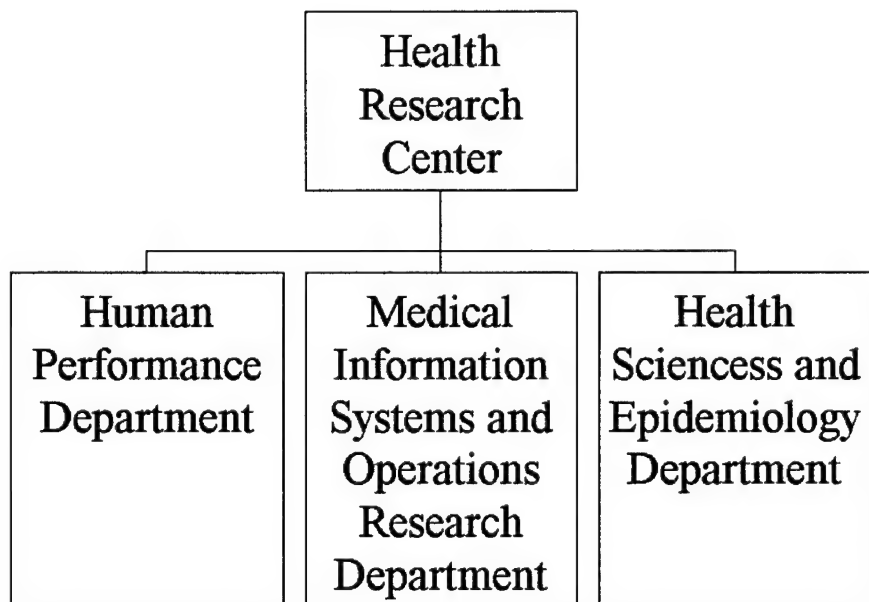
SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	113.800	<b>REAL PROPERTY</b>	7.479
ADMIN	129.900	* NEW CAPITAL EQUIPMENT	0.174
OTHER	74.500	<b>EQUIPMENT</b>	7.913
<b>TOTAL</b>	<b>318.200</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.134
<b>ACRES</b>	<b>33</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Naval Health Research Center

Abbreviated Functional Chart - Technical Organizations



**Naval Health Research Center**  
San Diego, CA 92186-5122  
(619) 553-8400

Commanding Officer: CAPT Larry M. Dean  
Scientific Dir: Dr. Don Stephen Nice

### MISSION

To support fleet operational readiness through research, development, test, and evaluation on the biomedical, psychological, and physiological aspects of Navy and Marine Corps personnel health and performance; and to perform such other functions or tasks as may be directed by higher authority.

### CURRENT IMPORTANT PROGRAMS

The R&D mission at Naval Health Research Center (NAVHLTHRSCHCEN) addresses three programmatic/functional areas:

- (1) Health Sciences and Epidemiology
- (2) Medical Information Systems and Operational Research
- (3) Human Performance

Within these functional programs areas are projects areas, each comprised of one or more research efforts.

- Environmental Extremes
- Occupational Health
- Alertness Management Systems
- Work Physiology
- Disease Surveillance
- Health Care Policy
- Special Operations
- Epidemiology
- Health Promotion
- Modeling of Human Performance
- Musculoskeletal Injury
- Biological Rhythms
- HIV Studies and Registry
- Model and Forecasting
- Cognitive Electrophysiology
- Infectious Disease Studies
- Psychological Stress
- Expert Systems
- Alcohol Rehabilitation
- Medical Informatics
- Defense Women Health Research Programs
- Unexplained Gulf War Illness Syndrome
- Microclimate Cooling
- Phase Change Materials

**EQUIPMENT/FACILITIES****Human Performance/Environmental Physiology Laboratory:**

A unique facility with a capability readily applied to any military platform need in the Fleet. Proximity to the San Diego and West Coast fleet maximizes tech transfer into the operational forces. Capability can also be mobile and can set-up a temporary human performance laboratory anywhere in CONUS and OCONUS.

**Equipment:**

Two environmental chambers; temperature range -20°F to 180°F; humidity 20-85%. Immersion tank; allows whole-body exposure, with temperature range of 45°F to 110°F. Swim flume; allows exposure to hot or cold moving water at 0 to 4 knots with temperature range of 45°F to 90°F.

Ergonometry equipment; Treadmills, cycles, skiing, upper body and swimming. Open-circuit spirometry metabolic measurement systems. Muscle strength and endurance computerized measurement systems. Biomechanics laboratory; Motion, ground reaction forces, EMG, equilibrium. Biochemistry laboratory; Clinical/hormonal chemistries. Electromyograph laboratory; EMG devices and computerized analysis equipment. Body composition laboratory; Anthropometric, hydrodensitometry, dual-energy x-ray absorptiometry, whole body water.

Infrared Camera system; measures surface skin temperatures. Tube suit calorimeter; measures six body regions for heat flux. Microclimate cooling systems; gel packs, water, air, water/air combined. Cold weather/high altitude human performance lab at Marine Corps Mountain Warfare Training Center, Bridgeport, CA.

Performance Assessment Battery (PAB); Computerized cognitive function tests. Biological Rhythms and Sleep Laboratory; Subjects in an isolation facility within the laboratory can be protected from exposure to outside light during sleep recordings. Sustained operations/continuous operations (SUSOPS/CONOPS) and circadian phase shifting studies are also conducted. Laboratory includes areas for cognitive testing and two sound insulated sleep room (one holding up to eight people in bunks for group studies, and a small room for one or two subjects). Four PAB stations are equipped with a variety of performance software linked in a Lantastic network allowing data from all four to be down loaded to the master unit which is equipped with an optical disk device for data storage. Controlled bright light administration is possible with the combination of a built in light system in the PAB testing room and portable light boxes. The isolation facility also includes a treadmill for exercising subjects.

Equipment: Polysomnography: Three Beckman (SensorMedics) 8 channel polygraphs; one Nihon Kohden 12 channel polygraph; one Nicolet Sleep Wake Analyzer - 3 bed, 32 channel EEG system; 14 Medilog 9000 portable EEG recorders; 1 Medilog 9000 scanner. Evoked Potentials: 1 Neuroscan EEG data acquisition and analysis system; 1 Nicolet Compact Four, portable electrodiagnostic system. Activity Monitors: 9 Ambulatory monitoring actigraphs; 10 ambulatory monitoring Version 6.6 actigraphs; 1 actigraph interface unit with software to download actigraph data to PC.

Miscellaneous: 1 Intoxilyzer breath alcohol analyzer; 2 Criticon Dinamap automatic blood pressure/pulse monitors; 7 386 PCs, one with APX 5200 optical disk drive for data storage; 3 Apollo Light Systems Bright Lite 3 Boxes.

Naval Health Research Center  
 San Diego, CA 92186-5122  
 (619) 553-8400

Commndng Offcr: CAPT Larry M. Dean  
 Scientific Dir: Dr. Don Stephen Nice

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.216	NA	0.216
6.1 Other	0.286	0.003	0.289
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	0.519	0.506	1.025
6.3	2.520	2.335	4.855
<b>Subtotal (S&amp;T)</b>	<b>3.541</b>	<b>2.844</b>	<b>6.385</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	0.234	0.442	0.676
6.7	0.328	0.644	0.972
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>4.103</b>	<b>3.930</b>	<b>8.033</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.667	0.660	1.327
Other	0.000	0.000	0.000
<b>TOTAL FUNDING</b>	<b>4.770</b>	<b>4.590</b>	<b>9.360</b>

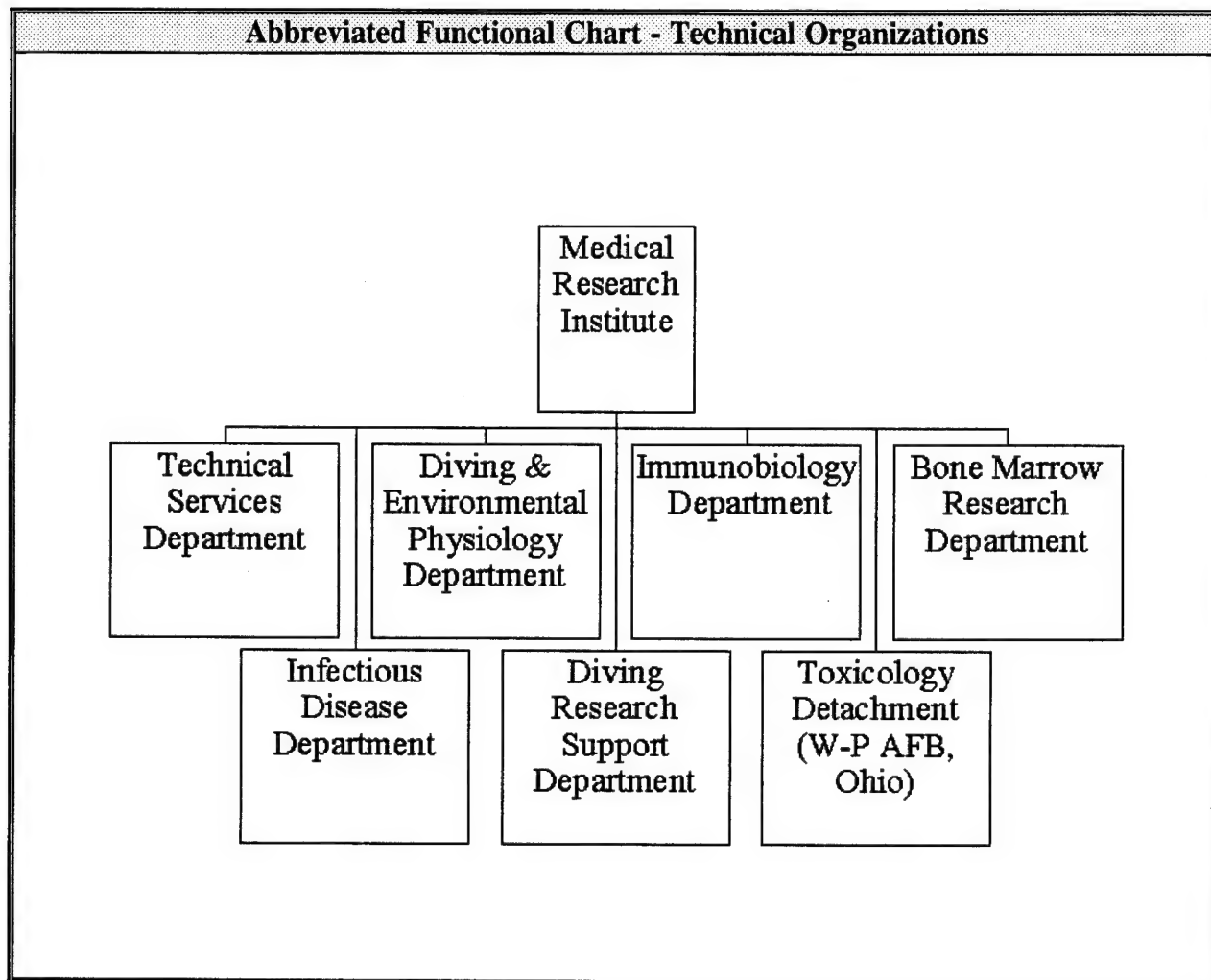
MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	22	10	3	9
CIVILIAN	58	14	28	16
<b>TOTAL</b>	<b>80</b>	<b>24</b>	<b>31</b>	<b>25</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	32.330	<b>REAL PROPERTY</b>	0.000
ADMIN	10.650	* NEW CAPITAL EQUIPMENT	0.000
OTHER	2.200	<b>EQUIPMENT</b>	2.158
<b>TOTAL</b>	<b>45.180</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.173
<b>ACRES</b>	<b>2</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## Naval Medical Research Institute



Naval Medical Research Institute  
Bethesda, MD 20889-5607  
(301) 295-0007

Commander: CAPT Robert G. Walter, DC  
Scientific Adv: CAPT R. W. Gaugler, MSC

### MISSION

To conduct research, development, tests and evaluations to enhance the health, safety, and readiness of Navy and Marine Corps personnel in the effective performance of peacetime and contingency missions, and to perform such other functions or tasks as may be directed by higher authority.

The specific functions to be accomplished are:

- a. Provide basic and applied research on infectious diseases, tissue transplantation, diving and hyperbaric medicine, casualty care, and environmental medicine and human factors which are directly related to military requirements and operational needs.
- b. Maintain a program of basic biomedical research in areas of military importance to develop knowledge in anticipation of future problems.
- c. Provide the scientific potential for the application of new biomedical knowledge to operational problems.
- d. Provide biomedical research capabilities to support field laboratories, hospitals and other naval activities in problems beyond their scope.
- e. Provide a source of scientific advisors and consultants readily available to operational commands.

### CURRENT IMPORTANT PROGRAMS

#### 1. Diving Medicine Program.

Includes studies on the safety and mission efficiency of diving equipment and procedures (especially decompression procedures), the physiology of diving and oxygen toxicity, novel decompression methods using Hydrogen/Oxygen gas mixtures, methods to improve diver performance, and improved treatment of diving medical problems.

#### 2. Infectious Disease Program

Includes studies on the development of vaccines, the design and development of rapid diagnostic methods, and the collection and analysis of epidemiological information on significant infectious disease threats to operating forces. Diseases studied include malaria, diarrheal diseases, dengue fever, HIV infection, hepatitis, and rickettsial diseases. Scientific expertise gained in these studies provide the basis for the deployment of field rapid diagnostic laboratories such as those deployed during Operations Desert Shield/Desert Storm and in Somalia. The laboratories were a major factor in the early diagnosis and treatment of disease in our troops, and their consequent rapid return to duty.

**CURRENT IMPORTANT PROGRAMS****3. Combat Casualty Care Program**

Includes studies on enhancement of wound healing, treatment and prevention of septic shock, control of immunological system processes, and methods to control and augment the formation of new blood cells.

**4. Environmental Stress/Toxicology Program** Includes studies to evaluate the significance of specific environmental factors unique to Navy operations; and develop standards for exposure to these factors, and/or methods to improve performance of personnel required to operate in these environments. Factors include both hot and cold thermal stress, electromagnetic radiation hazards, and toxicology of numerous Navy-related chemicals.

**5. Bone Marrow Transplantation and Immunology Program**

Includes studies on improved methods for typing of transplantation donors, methods for the isolation and controlled growth of blood cell precursor cells for reconstitution of the hematopoietic system, and the identification of cellular control mechanisms and development of methods for modulation of immune system activity.

**EQUIPMENT/FACILITIES**

Complex of 7 buildings (1 off site) containing approximately 160,000 square feet of laboratories, 25,000 square feet of office space and 13,000 square feet of storage.

The laboratory includes the following specialized facilities or equipment:

**1. Man-rated, Deep-dive Hyperbaric Research Chamber Complex:**

A DoD unique diving medical research chamber capable of reaching simulated depths of 300 meters, with full research quality level support systems, and composed of 5 separate, interconnected chambers, one with wet-pot capability.

**2. Large Animal Hydrogen Diving Chamber:**

A DoD unique chamber capable of accommodating large animals and using Hydrogen/Oxygen gas mixtures. Designed for use in the study of novel enzymatic decompression techniques.

**3. Emergency Hyperbaric Treatment Chamber:**

Special chamber designed for treatment of hyperbaric injuries or other clinical hyperbaric treatments.

**4. Scanning Transmission Electron Microscope:**

Standard research quality instrument approximately 10 years old.

**5. Fluorescence Cytometers:**

Three fully capable instruments, two with double laser capability, one with triple beam capability.

**6. Digital Imaging System**

Naval Medical Research Institute  
Bethesda, MD 20889-5607

Commander: CAPT Robert G. Walter, DC,  
US

(301) 295-0007

Scientific Adv: CAPT R. W. Gaugler, MSC

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.494	NA	0.494
6.1 Other	2.497	0.858	3.355
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	1.887	0.560	2.447
6.3	5.359	34.952	40.311
<b>Subtotal (S&amp;T)</b>	<b>10.237</b>	<b>36.370</b>	<b>46.607</b>
6.4	1.928	0.150	2.078
6.5	0.137	0.150	0.287
6.6	1.216	0.754	1.970
6.7	0.000	0.000	0.000
Non-DOD	0.154	0.165	0.319
<b>TOTAL RDT&amp;E</b>	<b>13.672</b>	<b>37.589</b>	<b>51.261</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	1.169	0.070	1.239
Other	7.066	4.158	11.224
<b>TOTAL FUNDING</b>	<b>21.907</b>	<b>41.817</b>	<b>63.724</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

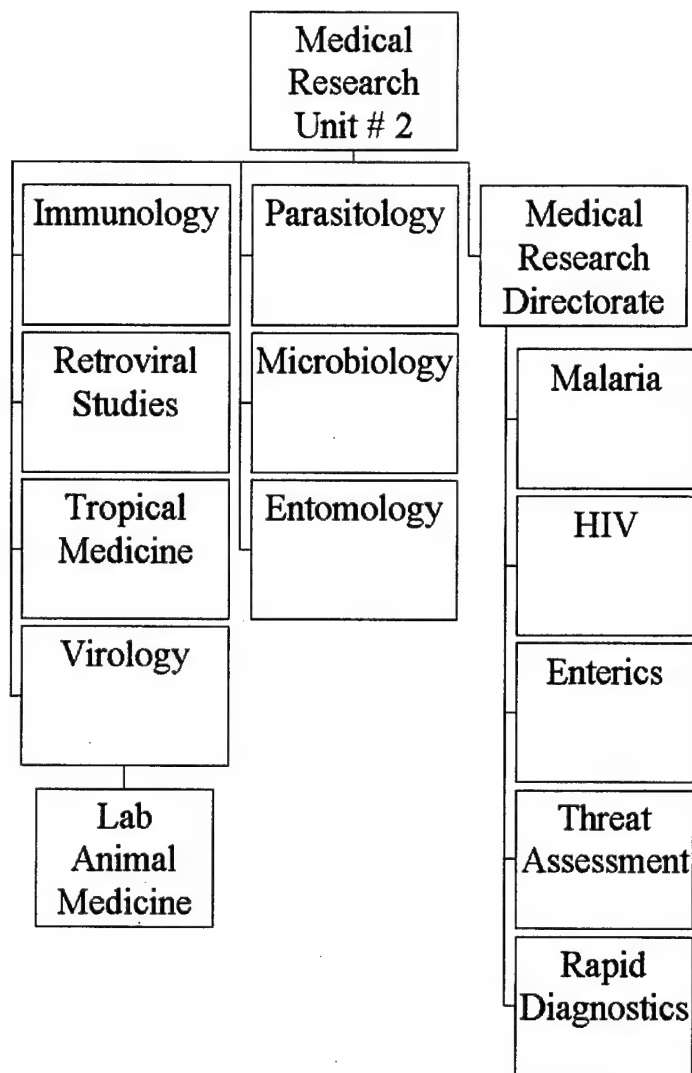
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	237	60	7	170
CIVILIAN	184	31	36	117
<b>TOTAL</b>	<b>421</b>	<b>91</b>	<b>43</b>	<b>287</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	161.930	<b>REAL PROPERTY</b>	8.200
ADMIN	63.875	* NEW CAPITAL EQUIPMENT	0.000
OTHER	0.000	<b>EQUIPMENT</b>	15.316
<b>TOTAL</b>	<b>225.805</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.640
<b>ACRES</b>	<b>7</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## Naval Medical Research Unit # 2

## Abbreviated Functional Chart - Technical Organizations



**Naval Medical Research Unit # 2**

Jakarta, Indonesia, 96520-8132

(62 ) 421-4454

Commander: CAPT F. Stephen Wignall

Exec. Officer: CDR. Steve Waltz

**MISSION**

Conduct RDT&E in Tropical Medical and Infectious Diseases to maintain and enhance the health, safety, and readiness of Navy and Marine Corp personnel in the performance of peacetime and contingency missions in Southeast Asia and other tropical and subtropical regions.

**CURRENT IMPORTANT PROGRAMS**

Evaluation of new antimalarial agents combinations of traditional antimalaria agents for the treatment and prevention of malaria in Indonesia.

Development of a malaria vaccine test site.

Determining the epidemiology of Hepatitis E Virus infections in Southeast Asia.

Identification of emerging infectious disease threat agents in Southeast Asia. This includes areas in Vietnam frequented by members of the Joint Task Force for Full Accounting.

Development and evaluation of methods for the rapid identification of infectious disease threat agents such as those responsible for febrile diarrhea, sexually transmitted diseases, and AIDS.

**EQUIPMENT/FACILITIES**

Mosquito breeding colony for parasite vector transmission and susceptibility studies with malaria and filariasis. Animal colony used in mosquito breeding, parasite studies, and for production of antigens and antibodies. Virology Department has capability of isolation and identification of human viral pathogens and also of performing serological tests for evidence of viral infections. Microbiology Department maintains a comprehensive diagnostic medical microbiology capability and in addition has sophisticated equipment and reagents required for biomolecular identification and characterization of microbial pathogens. Parasitology Department has developed the first procedure for the growth of filarid worms in vitro. Tropical Medicine Department utilizes a double laser flow cytometer for identification of specific white cell types by detecting specific epitopes on the white cell surface. NAMRU-2 also maintains a field laboratory in Jayapura, Irian Jaya which primarily is used to perform malaria related laboratory assays and also to process research specimens for shipment to the Jakarta lab. All Departments work closely with counterparts within Indonesian laboratories and hospitals.

The proposed transfer of the B13 Laboratory to NAMRU-2 Jakarta will give this command a state-of-the-art containment facility that exceeds all current requirements for work with biosafety level 3 pathogens. This facility will allow NAMRU-2 personnel to work safely, both at the lab bench and with experimental animals, with such regionally important agents as Rickettsia, Japanese B Encephalitis Virus and Hantaan Virus. It will also provide the needed biocontainment for proposed field programs to survey for emerging diseases in Indonesia.

Until 1 July 1994 NAMRU-2 maintained a detachment in Manila, Republic of the Philippines which is capable of detecting HIV specific antibodies, retroviral culture, and characterizing white blood cell populations by flow cytometry. Complete bacteriology laboratory facilities exist that could be utilized in future collaborative research in the Republic of the Philippines.

## Naval Medical Research Unit # 2

Jakarta, Indonesia, 96520-8132

(62 ) 421-4454

Commander: CAPT F. Stephen Wignall

Exec. Officer: CDR. Steve Waltz

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.377	0.000	0.377
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	0.592	0.013	0.605
6.3	0.540	0.029	0.569
<b>Subtotal (S&amp;T)</b>	<b>1.509</b>	<b>0.042</b>	<b>1.551</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	1.955	0.000	1.955
6.7	0.000	0.000	0.000
Non-DOD	0.056	0.000	0.056
<b>TOTAL RDT&amp;E</b>	<b>3.520</b>	<b>0.042</b>	<b>3.562</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.000	0.000	0.000
Other	0.943	0.051	0.994
<b>TOTAL FUNDING</b>	<b>4.463</b>	<b>0.093</b>	<b>4.556</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

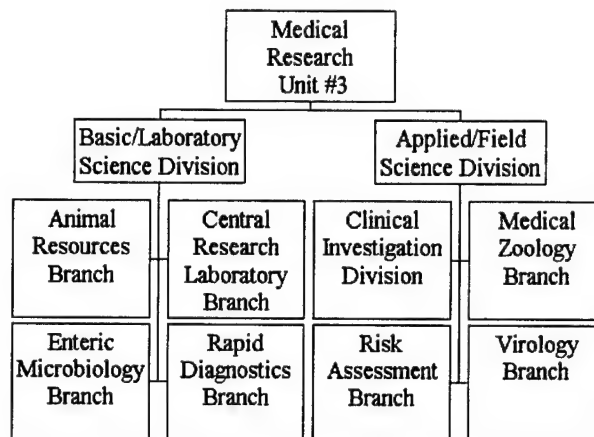
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	16	12	1	3
CIVILIAN	99	10	40	49
<b>TOTAL</b>	<b>115</b>	<b>22</b>	<b>41</b>	<b>52</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	16.900	<b>REAL PROPERTY</b>	1.878
ADMIN	10.990	* NEW CAPITAL EQUIPMENT	0.087
OTHER	4.400	<b>EQUIPMENT</b>	1.989
<b>TOTAL</b>	<b>32.290</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.116
<b>ACRES</b>	<b>0</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## Naval Medical Research Unit # 3

## Abbreviated Functional Chart - Technical Organizations



**Naval Medical Research Unit # 3**

Cairo, Egypt, 09835-0007  
(202) 284-1381

Commander: CAPT Alfred J. Mateczun

**MISSION**

To conduct research, development, test and evaluation to enhance the health, safety, and readiness of Department of Defense personnel assigned to Southwest Asia and Africa in the performance of peacetime and contingency missions, and to perform other such functions as may be directed by higher authority.

**FUNCTIONS:**

Conduct research programs in infectious diseases (ID) which directly relate to military medical requirements and operational needs.

Conduct interactive ID research with the Navy and other DoD medical R&D laboratories, specifically in areas of preventive medicine, epidemiology and tropical medicine.

Develop and maintain capability to provide ID risk assessment information and conduct research and development to improve prevention, diagnosis, and treatment of ID in the Fleet and Fleet Marine Force.

Maintain a technology base and scientific and technical expertise in infectious disease and tropical medicine to provide advisory assistance when requested.

Provide or undertake such other appropriate functions as may be authorized or directed.

**CURRENT IMPORTANT PROGRAMS**

Continuing assessment of regional infectious diseases of epidemic potential, and/or likely to hamper military operations.

Assessment of the efficacy of current drug treatment regimens to treat diseases such as schistosomiasis, diarrheal diseases and meningitis.

Determine the range of genetic variability of HIV-1 stains isolated from subjects with a wide spectrum for different risk factors for HIV infection.

Develop a field test site for phase 3 trials of enterotoxigenic E. Coli vaccine and identify the pathogenic strains of ETEC responsible for epidemics of diarrheal disease in Egypt.

Conduct phase 3 trial of enterotoxigenic E. Coli vaccine in Egyptian children and Northwest Europeans conducting Nile cruises.

**CURRENT IMPORTANT PROGRAMS**

Determine incidence of Rift Valley fever (RVF) in Egypt.

Characterize protective immune responses against Group B Meningococcus.

Assess the threat of Hepatitis E infections to deployed U.S. forces in Theater of Operation.

Isolate and propagate Hepatitis E virus in culture.

Determine incidence of Campylobacter strains responsible for diarrheal diseases in deployed forces in Egypt.

Continue technology base capability to rapidly identify, formulate control strategies and assess the threat of high hazard viral disease threats to military operations.

Continue tech base capability for identifying and evaluating the threat of arthropod vectors which transmit militarily important diseases.

**EQUIPMENT/FACILITIES**

The equipment and resources at NAMRU-3 make it competitive with any major research laboratory in the United States.

**BIOMEDICAL RESEARCH SCIENCE BUILDING:**

6 story state-of-the-art design completed in 1983. Clinical and Applied Research Laboratory. 2,750 Sq Ft P-3 level biohazard containment. Backup emergency generators and modern ventilation and waste disposal design.

**LIBRARY:**

Heavily used by local scientists/physicians. Subscription to over 75 scientific journals. Houses over 7000 reference books. Interacts with Library of Medicine (Bethesda) via CD-ROM and computer link through USAID.

**SNAIL BREEDING LABORATORY:**

Produces over 1 million cercariae per day.

**INSECTARY:**

Supports colonies of disease vectors such as ticks, mosquitoes and sandflies.

**EQUIPMENT/FACILITIES****ANIMAL FACILITY:**

Directed by U.S. Army Veterinarian and enlisted (91T) Veterinary Technician. State-of-the-Art Barrier Facility for breeding inbred mouse strains, rodents, geese, sheep, baboons, etc.

**PUBLIC WORKS FACILITY:**

Directed by U.S.N. Civil Engineering Corps Officer. Engineering: Maintenance, construction, design, transportation (30 vehicles). Shops: Automotive, electrical, mechanical, sheet metal, carpentry, paint, plumbing.

**OTHER SUPPORT FACILITIES:**

Administration, Finance, Supply, Public Works, Pharmacy, Medical Equipment Repair, Safety, Occupational Health, Computer and Post Office.

**ACCESS TO ABBASSIA FEVER HOSPITAL:**

Largest MOH Infectious Disease Hospital (1500 beds). Immediately adjacent to NAMRU-3. NAMRU-3 wards: FUO, Enteric Fever and Meningitis; Intensive Care Unit.

## Naval Medical Research Unit # 3

Cairo, Egypt, 09835-0007

(202) 284-1381

Commander: CAPT Alfred J. Mateczun

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.076	NA	0.076
6.1 Other	0.517	0.043	0.560
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	0.552	0.000	0.552
6.3	0.789	0.000	0.789
<b>Subtotal (S&amp;T)</b>	<b>1.934</b>	<b>0.043</b>	<b>1.977</b>
6.4	0.211	0.183	0.394
6.5	0.000	0.000	0.000
6.6	2.911	0.012	2.923
6.7	0.000	0.000	0.000
Non-DOD	0.197	0.000	0.197
<b>TOTAL RDT&amp;E</b>	<b>5.253</b>	<b>0.238</b>	<b>5.491</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.926	0.000	0.926
Other	0.225	0.000	0.225
<b>TOTAL FUNDING</b>	<b>6.404</b>	<b>0.238</b>	<b>6.642</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	34	9	6	21
CIVILIAN	181	17	5	155
<b>TOTAL</b>	<b>215</b>	<b>26</b>	<b>11</b>	<b>176</b>

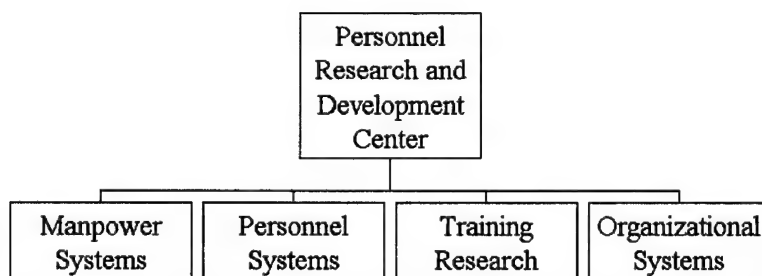
SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	68.244	<b>REAL PROPERTY</b>	10.600
ADMIN	9.058	* NEW CAPITAL EQUIPMENT	0.000
OTHER	71.330	<b>EQUIPMENT</b>	5.763
<b>TOTAL</b>	<b>148.632</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.158
<b>ACRES</b>	<b>4</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## Navy Personnel Research and Development Center

## Abbreviated Functional Chart - Technical Organizations



**Navy Personnel Research and Development Center**  
San Diego, CA 92152-7250  
(619) 553-7812

Commandg Offcr: CAPT J. D. McAfee  
Technical Dir: Mr. Murray W. Rowe

### MISSION

NPRDC serves as the Navy's principal research laboratory for developing Manpower, Personnel and Training (MPT) technologies. We maintain and enhance fleet readiness by developing state-of-the-art technology solutions to significant operational problems in Workforce Management, Personnel and Organizational Assessment, and Classroom and Afloat Training. The Center's expertise also encompasses personnel surveys, multicultural and gender research, quality of life issues, productivity enhancement, and biopsychometric research.

### CURRENT IMPORTANT PROGRAMS

**WORKFORCE MANAGEMENT** - A comprehensive program to improve the Navy's management of its personnel resources. Products include suites of integrated, computer-based models, databases and systems which enable: Rapidly collecting and displaying information on personnel force characteristics in easily understood graphic and tabular forms; Testing the effects of alternative policies on the workforce by mathematically simulating force dynamics under varying test policies; Developing and updating manning plans to reflect budgetary and end-strength constraints, and statistically forecasting losses and gains at several levels of detail within the enlisted and officer workforce.

Major projects include the Enlisted Strength Planning System, which enables monitoring all personnel force transactions on a daily basis; the Navy Training Reservation System (NTRS), designed to improve the way students are scheduled for Navy schools, while cutting times lost while students transition to and from schools; and Computer-Based Technology for Detailers, which (1) optimally matches rotating sailors to available jobs while considering moving costs, (2) meets sailors' location preferences, and (3) enables maximum use and reuse of individual skills.

**PERSONNEL AND ORGANIZATIONAL ASSESSMENT** - The goal of the overall research program is to enhance both personnel and organizational readiness. Efforts in Personnel Assessment address enlisted and officer selection, personnel testing, job classification, and performance measurement. The Center is DoD's Executive agent for the Computer Adaptive Testing version of the Armed Services Vocational Aptitude Battery (CAT-ASVAB) and has a strong program to improve the sensitivity and effectiveness of computer adaptive testing in general. Innovative measurement technologies, including biopsychometric measures, are also being explored for their usefulness in personnel assessment.

Organizational Assessment investigates and develops organizational solutions to meet Navy goals. Research projects focus on organizational and workgroup behavior. Major projects involve personnel surveys and attitude assessment, multicultural and gender integration, the role of quality of life factors in relation to readiness, and technical innovations to enhance workgroup productivity.

**CURRENT IMPORTANT PROGRAMS**

**CLASSROOM AND AFLOAT TRAINING** - A broad training and education research program that incorporates advanced instructional and computer-based training technologies to create new and better ways to teach complex warfighting skills. The goals of this program are to reduce costs associated with initial skills training as well as costs incurred for maintaining highly perishable but infrequently practiced job skills.

One of the major programs involves the Interactive Multisensor Analysis Trainer (IMAT), which integrates two advanced technologies (instructional methodology and computer-based graphics systems) in a unique visual and dynamic environment. IMAT is currently designed to support the very complex, multi-domain operator and tactician tasks performed in Undersea Warfare.

The system uses models, databases and algorithms to accurately generate representations of real world oceans, threat submarine propulsion systems, sensor arrays, and systems not currently centrally managed. The trainer can create a full range of visual simulations suitable to apprentice through master training by controlling the complexity and variability of the visual scene.

Instructors who previously relied on teaching through complex equations can now let the student "see" physical interactions that previously existed only in scientific notation. The application of this technology creates a training system that is cost-effective to operate and which represents the interactions of complex variables in a more understandable format.

**EQUIPMENT/FACILITIES**

The Center occupies approximately 86,000 square feet of space in converted World War II barracks buildings. Much of this is configured to accommodate the social science and mathematical analysis tasks performed on microcomputers and minicomputers. The facilities include upgraded electrical capability and air conditioning of the most equipment-intensive rooms. In addition, there are two facilities which contain computer rooms with raised flooring, central air conditioning, and upgraded electrical power. These are:

**Manpower and Personnel Research Computing Facility (MAPCOM):**

This is a 2,000 square foot IBM 4381 mainframe computer facility used to develop, process, and maintain statistical and forecasting systems; very large, complex personnel and training databases, and large software system applications.

**EQUIPMENT/FACILITIES****Training Research Computing Facility (TRCF):**

This is a 1,600 square foot Sun Systems facility, operating under the UNIX operating system. It provides network (internal and external) services, data analysis software, text processing support, graphics/video image processing software, and electronic mail/news services. The data analysis, text processing, and graphics/video image processing software is specialized and, in some cases, custom written for NPRDC applications. Some of the TRCF services required modifications to the UNIX operating system kernel, necessitating an NPRDC source license for the UNIX operating system.

Navy Personnel Research and Development Center  
 San Diego, CA 92152-7250  
 (619) 553-7812

Commanding Officer: CAPT J. D. McAfee  
 Technical Dir: Mr. Murray W. Rowe

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.219	NA	0.219
6.1 Other	0.031	0.057	0.088
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	2.668	0.468	3.136
6.3	4.392	5.969	10.361
<b>Subtotal (S&amp;T)</b>	<b>7.310</b>	<b>6.494</b>	<b>13.804</b>
6.4	0.075	0.005	0.080
6.5	0.607	0.321	0.928
6.6	0.848	1.456	2.304
6.7	0.806	0.270	1.076
Non-DOD	0.243	0.205	0.448
<b>TOTAL RDT&amp;E</b>	<b>9.889</b>	<b>8.751</b>	<b>18.640</b>
Procurement	0.122	0.282	0.404
Operations & Maintenance	5.170	3.960	9.130
Other	0.928	0.298	1.226
<b>TOTAL FUNDING</b>	<b>16.109</b>	<b>13.291</b>	<b>29.400</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	19	0	5	14
CIVILIAN	154	43	66	45
<b>TOTAL</b>	<b>173</b>	<b>43</b>	<b>71</b>	<b>59</b>

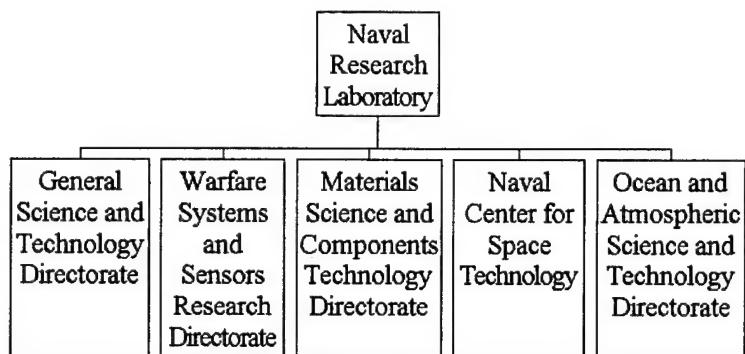
SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	60.500	<b>REAL PROPERTY</b>	1.710
ADMIN	21.100	* NEW CAPITAL EQUIPMENT	0.000
OTHER	4.500	<b>EQUIPMENT</b>	12.210
<b>TOTAL</b>	<b>86.100</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.638
<b>ACRES</b>	<b>3</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## Naval Research Laboratory

## Abbreviated Functional Chart - Technical Organizations



**Naval Research Laboratory**  
Washington, DC 20375-5320  
(202) 767-2541

Commanding Officer: CAPT R.M. Cassidy, Jr.  
Dir of Research: Timothy P. Coffey

### MISSION

Operate the Navy's full spectrum corporate laboratory to conduct a broadly based multidisciplinary program of scientific research and advanced technological development directed toward maritime applications of new and improved materials, techniques, equipment, systems and ocean, atmospheric, and space sciences and related technologies. In fulfillment of this mission, the Naval Research Laboratory:

- (1) Initiates and conducts scientific research of a basic and long-range nature in scientific areas of special interest to the Navy.
- (2) Conducts exploratory and advanced technological development deriving from or appropriate to the scientific program areas.
- (3) Within areas of technological expertise, develops prototype systems applicable to specific projects.
- (4) Performs scientific research and development for other naval commands and, where specifically qualified, for other agencies of the Department of Defense and, in defense-related efforts, for other Government agencies.
- (5) Upon request from appropriate naval commands, assumes responsibility as the Navy's principal R&D activity in areas of unique professional competence.
- (6) Serves as the principal activity for the Navy and its contractors in providing accurate calibration, test, evaluation and reference standards services on acoustic transducers and materials.
- (7) Serves as the lead Navy activity for mapping, charting, and geodesy (MC&G) research and development for the Defense Mapping Agency.

**LEADERSHIP AREAS:** NRL, the Navy's single, integrated corporate laboratory, provides the Navy with a broad foundation of in-house expertise from scientific through advanced development activity. Specific leadership responsibilities and expertise are maintained in the following areas:

- (1) Primary in-house research for the physical, engineering, space, and environmental sciences.
- (2) Broadly based exploratory and advanced development program in response to identified and anticipated Navy needs.
- (3) Broad multidisciplinary support to the Naval Warfare Centers.
- (4) Space and space systems technology, development, and support.

**CURRENT IMPORTANT PROGRAMS**

1. Advanced ECM and decoys for Navy EW systems.
2. Radars for countering the low cross-section sea-skimmer threat.
3. Fiber optic technology.
4. Biomolecular technology.
5. Tactical receive equipment.
6. Advanced ESM & Specific Emitter Identification (SEI).
7. Electronic Devices.
8. Littoral/Coastal Dynamics.
9. Environmental Remote Sensing.

**EQUIPMENT/FACILITIES****P-3 AIRCRAFT:**

NRL maintains five uniquely configured P-3 aircraft for research use. The aircraft are based at the NRL Flight Support Detachment, NAS Patuxent River, MD.

**MASSIVELY PARALLEL COMPUTATION FACILITY:**

This facility features a 16K node Thinking Machines CM-200 and a 256-node Thinking Machines CM-5. The CM-5 is in a very large memory, (high performance 32 Gbytes, >40 GFlop) configuration, permitting advanced research in computational fluid dynamics, meteorology, oceanography and other "physics-based" modeling not otherwise feasible. The facility has 100 Gigabytes of secondary storage and 4.5 Terabytes of tertiary storage. Extensive graphics and visualization facilities are also available.

**CENTRAL TARGET SIMULATION FACILITY:**

The CTS facility is a high performance, hardware-in-the-loop simulator used for real-time test and evaluation of electronic warfare systems and techniques for countering the missile threat to the Navy.

**EQUIPMENT/FACILITIES****MASS SPECTROMETRY FACILITY:**

Principal research instruments include: Finnigan TSQ-70 triple quadrupole mass spectrometer equipped with particle bombardment, electrospray, thermal desorption, electron ionization and chemical ionization capabilities. Ion trapping experiments are conducted on a superconducting magnet Fourier transform mass spectrometer equipped with an Extrel Odyssey data system. Ions are usually formed by laser desorption (with a variety of lasers). Ions can be trapped and studied by activation or reactions with neutrals. A hybrid instrument consisting of conventional magnetic/electrostatic sectors and quadrupoles (VG/Fisons ZAB 2FQ) for use in the study of ion properties. Two time-of-flight mass spectrometers (using MALDI) for studies of large molecules; one of these instruments is equipped to study ion-surface collisions. Conventional gas chromatograph/ mass spectrometers include a quadrupole based system (Hewlett-Packard 5988) and an ion trap based system (Finnigan ITS-40). An additional ion trap system (Varian Saturn III) is being used in the development of membrane introduction techniques for water analysis.

**FIRE RESEARCH PLATFORM (MOBILE, AL):**

EX-USS Shadwell (LSD15) has an overall length of 457 ft and a beam of 72 ft. As a test bed, the ship contains one pressure zone to study smoke management, including a collective protection system that has been created on all levels forward of frame 35. Selected ship systems that are important to fire protection and damage control have been reactivated, such as ventilation, electrical power, fluid distribution, fire mains, fire pumps, and internal communications.

**GAMBLE II FACILITY:**

Produces high-voltage (3 MV), high-current ( $> 1$  MA), short ( $< 100$  ns) pulses of energy of either positive or negative polarity. These terawatt (TW) power level pulses can be applied directly across a load (such as a gas column or wire) or can be used to produce powerful electron or ion beams. These high-power beams are then allowed to interact with x-ray converters or to propagate to a variety of targets. The facility is surrounded by thick concrete shielding to contain x-rays produced as a result of the high-power pulses. Diagnostics for the generator and the beams are monitored in a shielded room located outside the radiation area. Diagnostics include sophisticated computer-controlled transient recorders or oscilloscopes to record analog signals, numerous optical, x-ray or neutron diagnostics, and nuclear activation monitors.

**EQUIPMENT/FACILITIES****NANOELECTRONICS PROCESSING FACILITY:**

The NPF maintains a tool base of state-of-the-art processing equipment for micrometer and nanometer device and structure fabrication. There is a strong emphasis on computer-aided design and lithography utilizing an e-beam lithography system with a 10-nanometer spot size. To transfer patterns of these dimensions into a variety of metal, semiconductor or insulator materials, two reactive ion etchers are used. Ultra-violet and deep ultra-violet photolithographic equipment is available. Ultra-clean oxidation and polysilicon deposition furnaces are used to create high purity, low defect films. Low pressure chemical vapor deposition is also available for silicon oxide and nitride films. A number of different metal films can be deposited with high vacuum evaporation and sputtering equipment. A complete bonding and packaging capability exists within the NPF for all types of device mounting.

**MOLECULAR BEAM EPITAXY (MBE) OF III-V SEMICONDUCTORS:**

Five MBE reactors are dedicated to the growth of Group IV, Group II-VI and Group III-V semiconductors. All reactors are equipped to perform in situ surface and grown material analysis and have separate sample preparation and introduction chambers. For one of the III-V based semiconductor reactors two surface science chambers that permit in-vacuo transfer of epitaxial layers are available for growth studies. In the first chamber, an angle resolved electron spectrometer is used to determine the structure and chemical identity of the epitaxial layers near the film surface. In the second chamber, a scanning tunneling microscope and atomic force microscope are employed to determine surface morphology and film growth mode. There are also two analysis chambers for the Group IV semiconductor MBE system. The first chamber is a surface analysis laboratory with XPS, UPS, AES and SIMS while the second chamber has a LEED and a substrate heating stage.

**ACOUSTIC HOLOGRAPHY POOL FACILITY:**

The Acoustic Holography Pool Facility is a core research capability for in-water acoustics studies. The steel cylindrical tank is 55 feet in diameter, 50 feet deep, and contains 800,000 gallons of deionized water. The entire tank is vibration and temperature isolated. This unique laboratory is also instrumented with precise measurement systems, which include large workspace in-water robotic scanners capable of generating nearfield acoustic holography radiation and scattering database. A number of post-processing algorithms are available to convert these data bases into a variety of outputs including farfield target strength, images of the vibrating structure's normal velocity, structure-borne wave dispersion curves, and supersonic intensity. This facility is complemented by its "sister" pool similarly instrumented and directly linked which has a sandy sub grade for bottom interaction studies.

**EQUIPMENT/FACILITIES****THERMAL HIGH-VACUUM CHAMBERS:**

Three test chambers comprise an environmental testing complex designed to create and maintain high-vacuum and/or thermal conditions. The complex is completely self-contained, but does require utilities inputs and an adequate supply of liquid and gaseous nitrogen. The facility includes a chamber room, machinery room, and a 26,000-gal liquid nitrogen storage facility. The complex may be controlled automatically or manually.

**SPACECRAFT TEST FACILITY:**

A facility in which space hardware fabricated at NRL and by outside vendors is tested and qualified for flight by providing the following environments: Random Vibration, Sinusoidal, and Shock testing with capability to 35,000 pounds and 200 data acquisition channels; Thermal Vacuum Testing with capabilities up to 16 feet diameter and 30 feet long; Acoustic/Vibration Reverberation Testing with 30,000 pound and 10,000 cubic foot capability; Modal Testing; Static Loads Testing; Mechanisms and Deployment Testing, and Mass Properties Testing with 18,000 pound spin balance capability.

Naval Research Laboratory  
Washington, DC 20375-5320  
(202) 767-2541

Commndg Offcr: CAPT R.M. Cassidy, Jr.  
Dir of Research: Timothy P. Coffey

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	94.361	8.205	102.566
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	73.236	76.225	149.461
6.3	89.874	134.812	224.686
<b>Subtotal (S&amp;T)</b>	<b>257.471</b>	<b>219.242</b>	<b>476.713</b>
6.4	19.632	29.448	49.080
6.5	19.349	29.024	48.373
6.6	2.371	7.113	9.484
6.7	3.668	11.003	14.671
Non-DOD	6.329	18.988	25.317
<b>TOTAL RDT&amp;E</b>	<b>308.820</b>	<b>314.818</b>	<b>623.638</b>
Procurement	10.713	96.418	107.131
Operations & Maintenance	23.645	10.134	33.779
Other	27.568	15.290	42.858
<b>TOTAL FUNDING</b>	<b>370.746</b>	<b>436.660</b>	<b>807.406</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	2.000

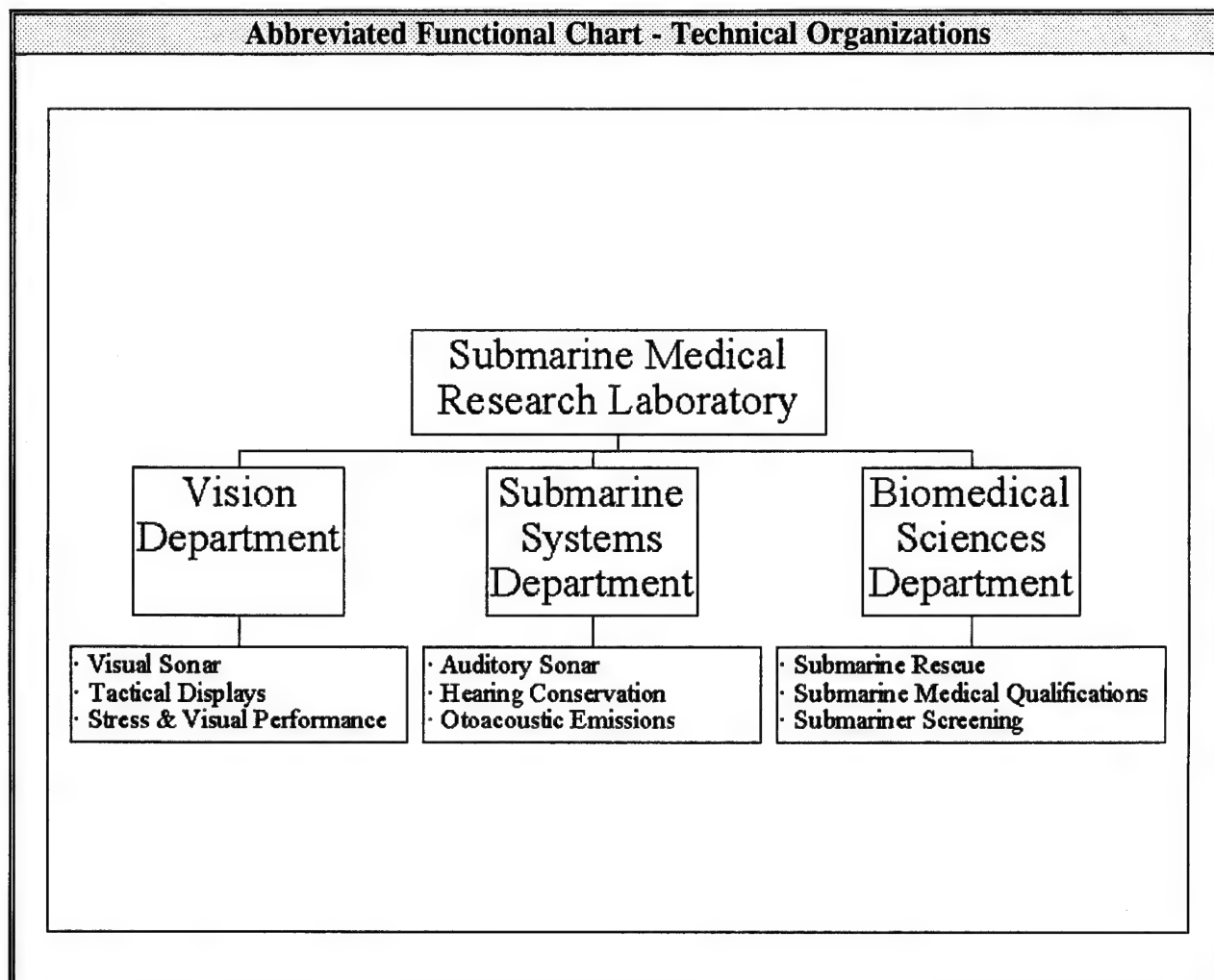
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	167	8	10	149
CIVILIAN	3,616	884	1,010	1,722
<b>TOTAL</b>	<b>3,783</b>	<b>892</b>	<b>1,020</b>	<b>1,871</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	3,292.468	<b>REAL PROPERTY</b>	215.809
ADMIN	224.564	* NEW CAPITAL EQUIPMENT	0.304
OTHER	429.040	<b>EQUIPMENT</b>	365.987
<b>TOTAL</b>	<b>3,946.072</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>632</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## Naval Submarine Medical Research Laboratory



**Naval Submarine Medical Research Laboratory**

Groton, CT 06349-5900  
(203) 449-2501

CO (Acting): CDR S.F. Blacke, MSC  
Technical Dir.: CDR M.D. Curley, MSC

**MISSION**

Provide timely, high quality Research and Development to the Submarine force to enhance auditory and visual sonar operator performance, submariner health and physical standards, closed environment atmospheric monitoring, submarine escape and rescue, and hearing conservation both in air and under the sea.

**CURRENT IMPORTANT PROGRAMS**

Medical problems associated with pressurized submarine rescue; reduction of attrition rates for submariners by better screening; improved performance on auditory, digital, and visual sonars; physiological performance effects of altered submarine atmospheres; hearing conservation; nutrition aboard submarines; evoked to acoustic emissions; tactical displays.

Sonar Display Enhancements - including development of headsets, analog and digital signal processing techniques, to maximize the intelligent, efficient use of man's visual and auditory systems.

Submarine Escape and Rescue - developing decision guidelines for survivors based upon physiological, engineering and operational factors, and providing guidance to operational commanders in establishing procedures and equipment for escape and rescue.

Submarine Clinical Issues - reducing the loss of talented personnel by instituting data-based decisions on Submarine Disqualifications/Waivers for conditions of kidney stones and asthma.

Hearing Conservation - developing guidelines for diver safe exposure limits to underwater noise from tools and sonars; exploring the use of evoked otoacoustic emissions to detect the early stages of hearing loss.

Tactical Displays - providing ways to enhance operator performance by applying our knowledge of the human sensory systems, specifically using color, symbology, highlighting cues, orientation, and default presentations.

Psychiatric Screening of all enlisted and officer submarine candidates undergoing training at Basic Enlisted Submarine School and Submarine officers Basic Course.

Submarine Atmospheres - develop, maintain data base of submarine atmosphere constituents from varied data sources, answer such health questions as arise from data, and recommend better submarine atmospheric monitoring and control.

**EQUIPMENT/FACILITIES**

Laboratory facilities for use of up-to-date equipment and instruments to perform basic and applied research. Facilities include two-man rated 300 and 150 PSIG hyperbaric chambers. Complete exercise physiology lab; instrumentation shop; technical library; graphic arts and photography shop.

Anechoic chambers; psychoacoustical lab. operational sonar simulation labs; mass spectrometers, gas chromatograph.

1. Multi-man, dual lock hyperbaric chamber that has been certified as an audiometric test facility. This quiet chamber is essential to electro-acoustic and psycho-acoustic research on the development of hearing conservation standards for diving operations. This test chamber also has the capacity to be altered to perform hyperbaric operations.
2. A large reverberation room that is used for submarine habitability studies. Up to ten men may be housed within the room while being exposed to noise conditions. This facility is currently dedicated to the establishment of acoustic habitability standards for submarines and surface vessels using powerful low frequency sonar.
3. A large anechoic chamber that is used for studies of the ear in free-field conditions. This facility is used to make control measurements of the characteristics of the ear in order to develop models of the ear for spatial localization and synthesized localized three dimensional sounds (virtual reality). This facility is also required to explore the feasibility of free-field listening techniques for sonar operator displays.
4. Experimental vision/perception Laboratory which includes photometric/spectroradiometric/optical bench equipment. No other DoD laboratory has developed a research thrust aimed at analyzing the visual display characteristics of sonar reception most compatible with the human operator.
5. A specialized computer automated psychoacoustics laboratory for experiments on sonar operator performance. This facility may be used to test four men at a time using advanced sonar target presentation techniques.
6. A sonar simulation facility also used for advanced studies of active and passive sonar operator performance using "real-life" or simulated sonar contacts.
7. NSMRL has additional specialized laboratory facilities, i.e., biochemistry, gas chromatography/mass spectrometry, pulmonary physiology. These facilities, while not unique within DON or DoD, are essential in that they are dedicated to the specialized operational problems of submarine environments and crew health and safety considerations.

## Naval Submarine Medical Research Laboratory

Groton, CT 06349-5900

(203) 449-2501

CO (Acting): CDR S.F. Blacke, MSC

Technical Dir.: Cdr M.D. Curley, MSC

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
RDT&E:			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.316	0.098	0.414
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	0.000	0.000	0.000
6.3	0.210	0.015	0.225
Subtotal (S&T)	0.526	0.113	0.639
6.4	0.836	0.068	0.904
6.5	0.118	0.002	0.120
6.6	0.729	0.142	0.871
6.7	0.000	0.000	0.000
Non-DOD	0.097	0.000	0.097
TOTAL RDT&E	2.306	0.325	2.631
Procurement	0.000	0.000	0.000
Operations & Maintenance	1.229	0.597	1.826
Other	0.059	0.015	0.074
TOTAL FUNDING	3.594	0.937	4.531

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

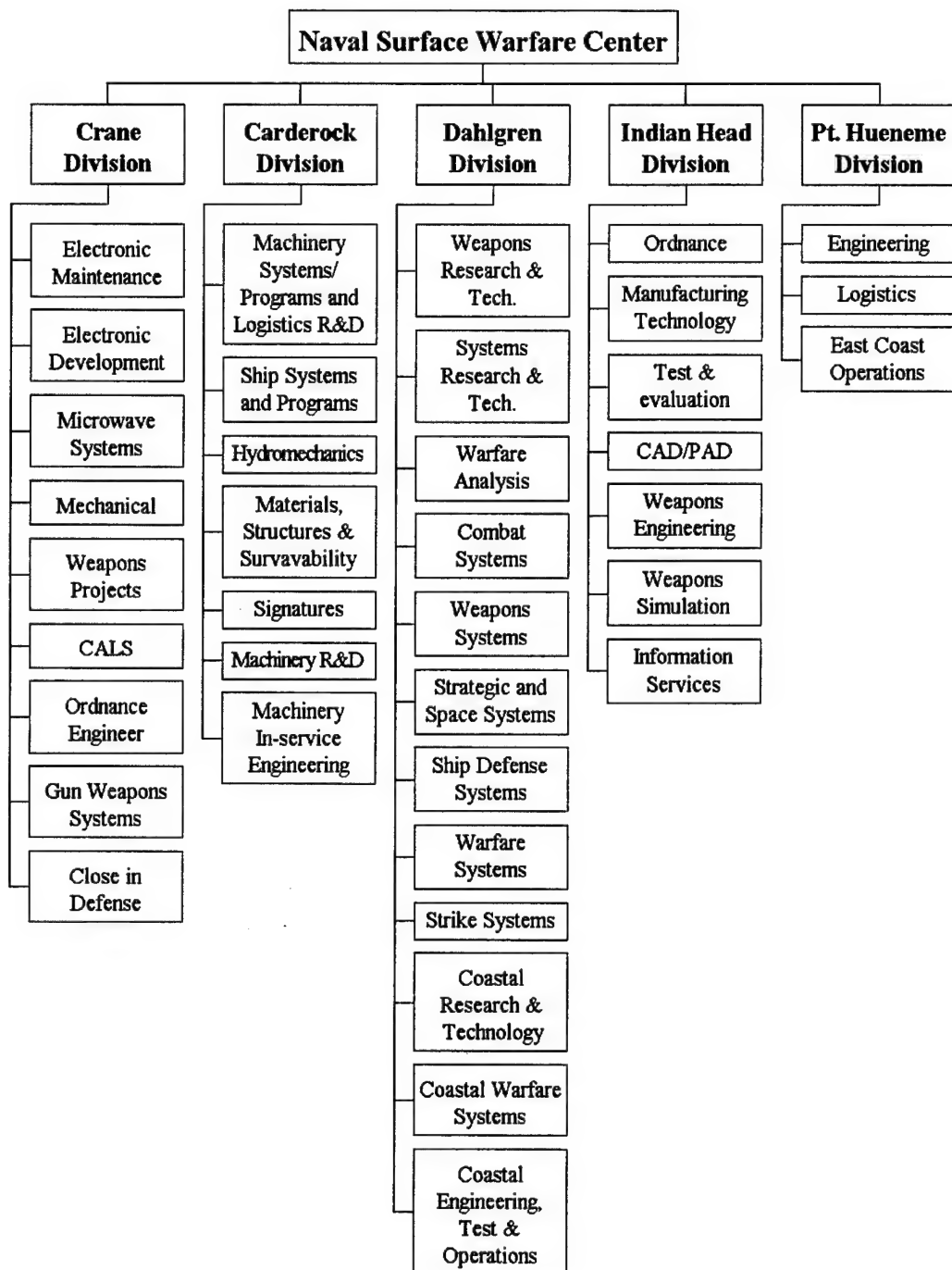
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	25	6	0	19
CIVILIAN	33	8	4	21
TOTAL	58	14	4	40

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	46.183	REAL PROPERTY	0.000
ADMIN	10.537	* NEW CAPITAL EQUIPMENT	0.000
OTHER	4.962	EQUIPMENT	4.147
TOTAL	61.682	* NEW SCIENTIFIC & ENG. EQUIP.	0.160
ACRES	0	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## Naval Surface Warfare Center

## Abbreviated Functional Chart - Technical Organizations



Naval Surface Warfare Center  
Arlington, VA 22242-5160  
(703) 602-0632

Commander: RADM D.P. Sargent, Jr.  
Technical Dir.: Dr. Ira Blatstein

### MISSION

Operate the Navy's full spectrum RDT&E, engineering and fleet support center for ship hull, mechanical and electrical systems, surface ship combat systems, coastal warfare systems, and other offensive and defensive systems associated with surface warfare.

### CURRENT IMPORTANT PROGRAMS

Propulsion machinery systems and components test, evaluation and in-service engineering. Hull, mechanical and electrical (HM&E) auxiliary machinery systems and components test and evaluation and in-service engineering. HM&E electrical machinery systems and components test and evaluation and in-service engineering. Hull and deck machinery systems components test and evaluation and in-service engineering. Surface warfare modeling and analysis. Ship vulnerability and survivability. Surface and undersea vehicle hull machinery, propulsors and equipment. Platform systems integration AEGIS combat system. Ship self defense-including the self defense test ship. Cruise weapon systems-Tomahawk and Harpoon. Gun weapon systems. Standard missile. Continuous processing of composite propellants (an international cooperative R&D agreement to develop processing). Ordnance environmental R&D of energetics processing technologies. Gun propulsion R&D for the Navy's Electrothermal Chemical (ET-C) gun and Range Enhancement Near-Term (RENT) programs. Tri-service RDT&E, engineering, manufacturing, and fleet support for cartridges, cartridge and propellant actuated devices, and aircrew escape propulsion systems. RDT&E for Navy and Marine Corps Mine Countermeasures (MCM) including: distributed explosives technology, demonstrative/advanced countermeasure system, surf zone MCM, and shallow water MCM. Gun weapon system replacement program. MK 15 Phalanx close-in weapon system overhaul project. MK 45 gun engineering project. 76mm MK 75 program and life cycle support. SLQ-32 electronic countermeasures systems. Miniature/microminiature electronic repair. Precise integrated navigation systems (PINS) ISEA/ILS/DOP. AN/SYQ-13 navigation systems. Trident. Submarine Launched Ballistic Missile (SLBM) targeting. Unmanned Aerial Vehicle (UAV). Ship-self defense systems. Vertical Launch System (VLS). Gun ammunition. Mines. Warheads. ASW systems. EW systems. AEGIS radar, search and track. EM effects. Magnetic silencing. Chemical and biological defense. Ship/airborne mine CM combat system integration. Diving and life support. Special warfare. Amphibious warfare.

**EQUIPMENT/FACILITIES****Dahlgren Site:**

Wind tunnel complex with capability to MACH 18. 25 mile Potomac River range for testing guns, ammunition, and integrated shipboard sensors. Disk pack facility for SLBM fire control systems and targeting. SLBM retargeting facility. Product assurance and simulation facilities for surface ship combat systems. AEGIS computer facility. Magnetic silencing facility. Ocean and harbor ranges. 1.75 million gallon hydroballistic tank. Mine tank and sensor facilities for testing mines and underwater systems, explosives and warheads. Materials research facilities. Chemical/biological defense laboratory. Nuclear effects facility. General purpose laboratories. Compartmented laboratory.

**Dahlgren Coastal Systems Station:**

Expeditionary Warfare modeling and simulation. Mines and mine countermeasures equipment and systems. Specialized mine warfare transducers and active/passive sonar modeling for MCM. Special Warfare mission equipment. Ocean simulation to 2,250' depth. Diving and Life Support systems development and test. Gas Analysis. Fleet diving support complex. Gulf test range. Magnetic target detection and classification range. Mine exploitation complex. Pier space. Boats, heliport complex with equipment. Gulf test range.

**Crane:**

Overwater radio frequency (RF) test range. Surveillance radar overhaul facility. Special equipment and computers for microelectronics technology. Electron linear accelerator. Materials analysis instrumentation. State-of-the-art CAD/CAE modeling and simulation tools and automated test equipment which accommodate any range of circuit card technology. Thick film circuit card manufacturing laboratory.

**Carderock Philadelphia Site:**

Full-scale IPMP (SSN-21) steam propulsion land based test site. Full-scale LSD-41 diesel propulsion land based test site. Full-scale DDG-51 gas turbine land based test site. Full-scale electric drive/machinery module land based test site. Full-scale gear meteorology and calibration lab. Full-scale air compressor test site. Full-scale submarine life support test site. Full-scale submarine generator test site. Full-scale submarine ship service generator test site. Fire, pollution, marine equipment lab. Full-scale conveyor and elevator test complex. Full-scale submarine mast bending test facility. Full-scale submarine periscope/antenna test sites. Full scale submarine buoy communication test site. Chemistry and metallurgy lab. Full-scale gravimetric flow calibration lab. Test operations. Analysis and control center. Full-scale steam propulsion testing complex.

**Carderock Division - Patuxent River, MD:** Special trials unit; surface effects test ship.

**Carderock Division - Memphis, TN:** Large Cavitation Channel (LCC).

**EQUIPMENT/FACILITIES****Carderock Bethesda Site:**

Simulation, planning and analysis research Center. Explosives test pond. Data and image processing systems. David Taylor model basin complex. Maneuvering and seakeeping basin. Rotating arm basin. Radio Controlled model facility. Circulating water channel. 24-inch and 36-inch cavitation channels. Dynamic control system simulator. 140-foot towing basin. Hydrodynamic/hydroacoustic technical center. Deep submergence pressure tanks. Structural evaluation lab. Wind tunnels.

**Carderock Annapolis Site:**

Fire research and air contamination facility. Machinery systems silencing lab. Acoustics materials lab. Magnetic fields lab. Low observable materials lab. Advanced electrical machining. Technology and development facility. Submarine fluid dynamics facility. Electric power tech lab. Metallic materials and processing facility. Marine composites lab. Marine coatings and corrosion control facility. Marine tribology lab. Deep ocean pressure simulation facility. Shipboard environmental protection facility.

**Carderock Division - Portsmouth, VA:** Shock trials instrumentation.

**Carderock Division - Bayview, ID:** Acoustic research detachment.

**Carderock Division - Santa Cruz, CA:** Acoustic range facility, radar imaging facility.

**Carderock Division - Bremerton, WA:** Carr Inlet test facility.

**Carderock Division - Ketchikan, AK:** Southeast Alaska facility.

**Carderock Division - Panama City, FL:** Lauren & Athena research vessels/ship systems.

**Carderock Division - Cape Canaveral, FL:** Research Vessel Hayes.

**Carderock Division - Norfolk, VA:** Combatant craft engineering detachment.

**Indian Head:**

Continuous processing facility. Composite case/component overbraiding facility. Synthesis and scale-up facilities for all types of energetic materials. Test facilities. Surface warfare engineering facility. Electrostatic Discharge (ESD) facility.

**Port Hueneme Division, Port Hueneme, CA:** Surface Warfare Engineering Facility.

**Port Hueneme Division, San Diego, CA:** Integrated Combat Systems Test Facility (ICSTF).

**Port Hueneme Division, Dam Neck, VA:** Software program generation and life-cycle maintenance laboratories.

Naval Surface Warfare Center  
Arlington, VA 22242-5160  
(703) 602-0632

Commander: RADM D.P. Sargent, Jr.  
Technical Dir.: Dr. Ira Blatstein

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	5.145	NA	5.145
6.1 Other	3.773	2.987	6.760
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	87.146	52.620	139.766
6.3	52.121	31.229	83.350
<b>Subtotal (S&amp;T)</b>	<b>148.185</b>	<b>86.836</b>	<b>235.021</b>
6.4	280.835	165.769	446.604
6.5	95.846	44.384	140.230
6.6	17.011	41.932	58.943
6.7	40.582	22.730	63.312
Non-DOD	11.591	3.611	15.202
<b>TOTAL RDT&amp;E</b>	<b>594.050</b>	<b>365.262</b>	<b>959.312</b>
Procurement	610.145	321.802	931.947
Operations & Maintenance	475.498	203.012	678.510
Other	326.796	115.281	442.077
<b>TOTAL FUNDING</b>	<b>2,006.489</b>	<b>1,005.357</b>	<b>3,011.846</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	62.600

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	554	0	96	458
CIVILIAN	19,497	393	7,445	11,659
<b>TOTAL</b>	<b>20,051</b>	<b>393</b>	<b>7,541</b>	<b>12,117</b>

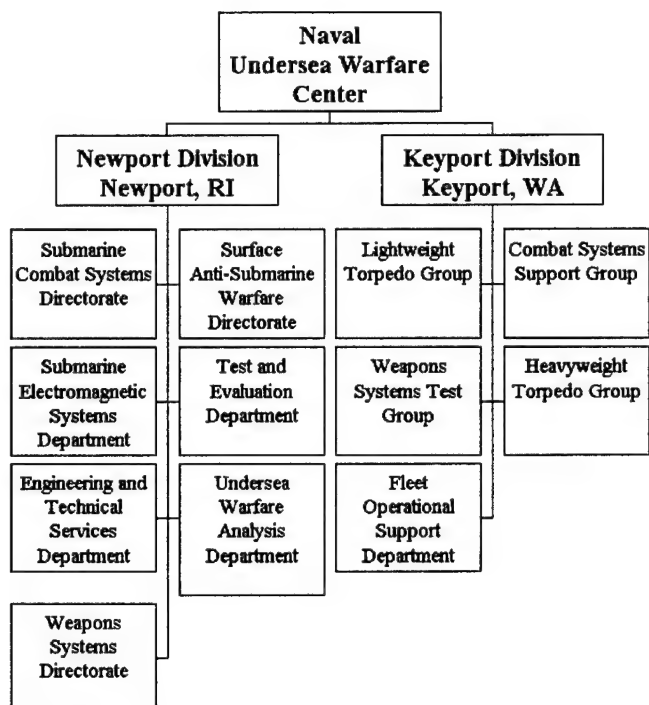
SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	7,512.600	<b>REAL PROPERTY</b>	1,295.600
ADMIN	1,713.800	* NEW CAPITAL EQUIPMENT	33.800
OTHER	17,371.900	<b>EQUIPMENT</b>	1,693.300
<b>TOTAL</b>	<b>26,598.300</b>	* NEW SCIENTIFIC & ENG. EQUIP.	47.200
<b>ACRES</b>	<b>72,632</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## Naval Undersea Warfare Center

## Abbreviated Functional Chart - Technical Organizations



**Naval Undersea Warfare Center**  
Newport, RI 02841-1708  
(401) 841-6769

Commander: RADM Scott L. Sears  
Technical Dir.: Earle L. Messere

### MISSION

Operate the Navy's full-spectrum RDT&E, engineering, and fleet support center for submarines, autonomous underwater systems, and offensive and defensive weapon systems associated with undersea warfare.

### CURRENT IMPORTANT PROGRAMS

**SUBMARINE COMBAT SYSTEMS:** Combat Control System Improvement Program (CCS MK1/2), AN/BSY-2/BQG-5 Submarine Combat System, AN/BSY-1 Combat Control, TRIDENT Defensive Weapons Systems, TRIDENT Mission Support, New Attack Submarine Program, Submarine Combat Systems, SSN-21 Combat System Development.

**SUBMARINE SENSORS:** AN/BQQ-5 Submarine Sonar, Periscopes, Submarine Electronic Warfare Systems, Submarine Antennas, Electro-Optic/Fiber Optic Sensors, Sonar Advanced Development, Submarine Ancillary Sonar Systems.

**SUBMARINE WEAPONS & LAUNCHERS:** Torpedo MK 48, Torpedo MK48 ADCAP, TOMAHAWK Cruise Missile Submarine Launched, Mobile ASW Target MK 30, Submarine Weapon Storage and Launch, EMATT Target, Torpedo MK 50, Torpedo MK 46, USW Countermeasures, Unique Mines, SSN-688/SSN-21 Launcher Systems.

**SUBMARINE COMMUNICATIONS:** Navy EHF SATCOM Program, EM Communications Systems, Shipboard Interior Communications Systems.

**COMBAT SYSTEMS:** Surface Combat Systems, CV-ASW Module, Combat Systems Common, Missiles, ASW Testing.

**SURFACE SHIP SONAR:** AN/SLQ-25A Program, AN/SQQ-89 Basic, Surface Ship ASW Advanced Development (SSASWAD), Surface Ship Acoustic Analysis Center (SSAAC), Surface Ship Torpedo Defense (SSTD), AN/SQQ89 On Board Trainer.

**T&E/RANGES:** Atlantic Undersea Test & Evaluation (AUTEC), Southern California ASW Training Range (SOAR), Barstur Upgrade, Australian Underwater Tracking Range, Deep Water R&D Range, Portable Tracking System, Range Technology Program, Ranges, Mobile Sea Range, Pacific NW Range System, Deployable Range System, SOCAL/MIDPAC Range Systems.

**NAVIGATION:** Dead Reckoning Navigation, Submarine Inertial Navigation, Surface Inertial Navigation.

**CURRENT IMPORTANT PROGRAMS**

**UNDERSEA WARFARE SCIENCE AND TECHNOLOGY:** Undersea Vehicle Guidance and Control; Undersea Vehicle Hydrodynamics, Quieting and Propulsion; Acoustic and Torpedo Countermeasures; Unmanned Undersea Vehicle; Weapon and Small Device Launcher; Submarine Combat Tactical Control.

**UNDERSEA WARFARE MODELING AND ANALYSIS:** S&T Requirements Analysis, New Program Requirements Development, Cost and Operational Effectiveness Analysis (COEA) for Acquisition Programs, Early Operational Assessment, Fleet Employment Guidelines and Tactical Decision Aids, Intelligence Data Assessment, Submarine and Undersea Warfare Synthetic Environments.

**OTHER:** Arctic Submarine Lab, Mines, Surveillance, Other USW.

**EQUIPMENT/FACILITIES****NUWC Division, Newport, RI:**

Reverberant Acoustic Test Facility; Anechoic Chamber, Low Noise Wind Tunnel, Advanced Submarine Launcher Facility; Advanced Underwater Vehicle Quiet Propulsion Research and Development Facility; Advanced Underwater Vehicles Laboratory; Combat Systems Technology Laboratory; Combat Control Systems Laboratory; Undersea Warfare Analysis Laboratory; Missile Simulation, Development, and Test Facility; Propulsion Noise Test System; SSN-688 Vertical Launch System Missile Tube Test Facility; Transient Flow Loop Facility; Weapons Analysis Facility; Littoral Undersea Warfare Test Facility Complex; Training Test and Evaluation Analysis Laboratory.

**NUWC Detachment, New London, CT:**

Acoustic Display Research Facility; Hybrid Microcircuit Design and Fabrication Facility; Integrated Transducer Design Facility; Land-Based Integrated Test Site; Man-Machine Sonar Test Bed; Periscope Research and Development Test Facility; Quiet Water Tunnel Experimental Facility; Submarine Over-Water Antenna Test Facility; Towed Array Complex.

**NUWC Detachment, Dodge Pond, CT:**

Dodge Pond Acoustic Measurement Facility.

**NUWC Detachment, Andros Island, Bahamas:**

Atlantic Undersea Test and Evaluation Center (AUTEC); R/V NUWC Ranger.

**NUWC Detachment, Seneca Lake, NY:**

Seneca Lake Acoustic Measurement Facility; Submarine Antenna Test Range (Fisher's Island, NY); Submersible Sensor Test Platform (Fisher's Island, NY).

**EQUIPMENT/FACILITIES****NUWC Division, Keyport, WA:**

Undersea Weapons Repair and Maintenance Depot, Undersea Weapon Evaluation Facility (UWEF), Range Information Display Center (RIDC), CV-ASW Module Laboratory, Pacific NW Range System, Torpedo Explosive Operating Complex, Torpedo Storage Magazines, Hardware Environmental Test Facility, Target Mk 30 and Range Tracking Pinger IMA, Shipboard Electronic Systems Evaluation Facilities (SESEF), Combat Systems Facilities, Transducer Automated Test Facility, Weapon Acceptance and Operational Test Facility, Underwater Noise Analysis Facility (UNAFAC), Light Industrial Support Facility, Industrial Waste Treatment Facility, Hazardous Waste Treatment, Storage, and Disposal Facility, Otto Fuel II Reclamation Plant, Lithium Decontamination Facility, Recycling Facility, Hyperbaric Chamber, Automated Material Handling Facility, Naval Undersea Museum, Navy Mine Depot, Range Craft, NUWC Northwest Ranges, Range Display and Information Center

**NUWC Detachment, Hawaii:**

MIDPAC Range System, Post-operational Analysis Critique and Exercise Review Facility, TargetMK 30 and Range Tracking Pinger IMA, Shipboard Electronic Systems Evaluation Facility.

**NUWC Detachment, San Diego, CA:**

Arctic Submarine Laboratory, SOCAL Range System, Target MK 30 and Range Tracking Pinger IMA, Shipboard Electronic Systems Evaluation Facility, Post-operational Analysis Critique and Exercise Review facility.

Naval Undersea Warfare Center  
Newport, RI 02841-1708  
(401) 841-6769

Commander: RADM Scott L. Sears  
Technical Dir.: Earle L. Messere

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	2.700	NA	2.700
6.1 Other	0.600	0.400	1.000
6.2 IED (Navy)	0.000	0.000	0.000
6.2 Other	20.100	14.500	34.600
6.3	7.600	5.500	13.100
<b>Subtotal (S&amp;T)</b>	<b>31.000</b>	<b>20.400</b>	<b>51.400</b>
6.4	54.000	41.200	95.200
6.5	62.600	61.800	124.400
6.6	12.600	32.400	45.000
6.7	14.900	16.000	30.900
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>175.100</b>	<b>171.800</b>	<b>346.900</b>
Procurement	247.500	263.800	511.300
Operations & Maintenance	133.900	73.300	207.200
Other	88.700	57.300	146.000
<b>TOTAL FUNDING</b>	<b>645.200</b>	<b>566.200</b>	<b>1,211.400</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	346	1	18	327
CIVILIAN	6,562	143	2,896	3,523
<b>TOTAL</b>	<b>6,908</b>	<b>144</b>	<b>2,914</b>	<b>3,850</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	3,911.500	<b>REAL PROPERTY</b>	245.000
ADMIN	243.500	* NEW CAPITAL EQUIPMENT	12.400
OTHER	2,476.400	<b>EQUIPMENT</b>	686.700
<b>TOTAL</b>	<b>6,631.400</b>	* NEW SCIENTIFIC & ENG. EQUIP.	81.500
ACRES	3,239	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

DEPARTMENT OF THE AIR FORCE

DEPARTMENT OF THE AIR FORCE

The Air Force's eight (8) In-House RDT&E Acitivities are:

Armstrong Laboratory ..... 4-2

Arnold Engineering Development Center ..... 4-6

Development Test Center.....4-10

Flight Test Center .....4-14

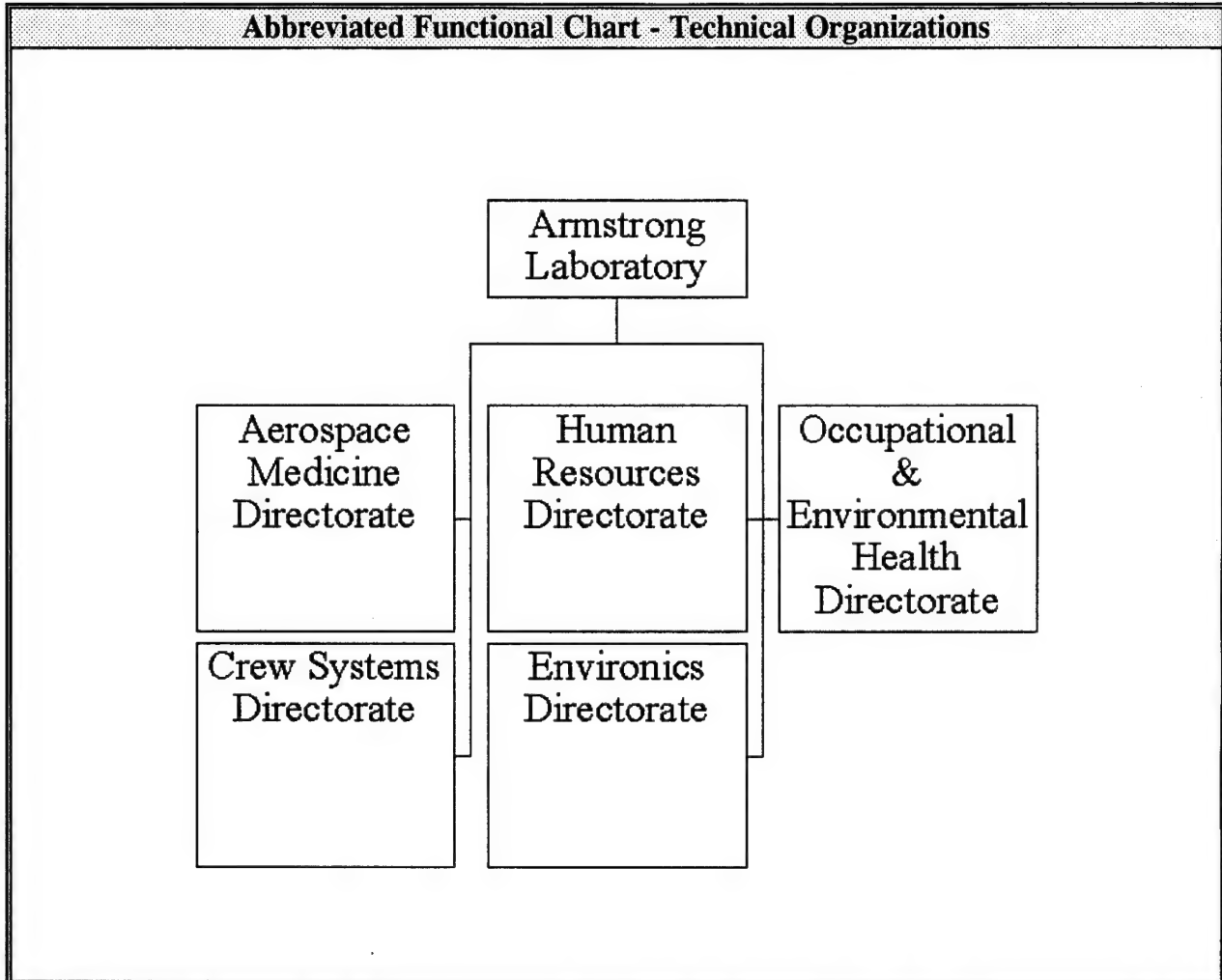
Phillips Laboratory .....4-18

Rome Laboratory .....4-22

Wright Laboratory .....4-26

46th Test Group .....4-30

## Armstrong Laboratory



**Armstrong Laboratory**

San Antonio, TX 78235-5118  
(210) 536-3966

Director: Dr. Brendan B. Godfrey  
Deputy Director: Col Richard F. Jones

**MISSION**

Advance and apply technology to provide the Air Force with superior capabilities in the areas of human resources, crew systems, aerospace medicine, environics, and occupational/environmental health through integration execution of research, development, and operational support. Sponsor and conduct research and development in the fields of biodynamics, biocommunications, environmental compliance, site restoration, toxic hazards, radiation/directed energy bioeffects, aeromedical selection/retention, human engineering, crew protection/life support, logistics and human factors, force acquisition and management, instructional strategies, job skill development and retention, and training devices/systems.

**CURRENT IMPORTANT PROGRAMS**

The resources of the Armstrong Laboratory are organized into five integrated "thrusters" which bridge specific research programs and projects. Technical thrust areas are: crew systems; human resources; aerospace medicine; occupational and environmental health; and environics. The Armstrong Laboratory is also host to "Tri-Service Research Centers" in toxicology and directed energy, created in accordance with the Project Reliance initiative for DoD laboratory consolidation

**EQUIPMENT/FACILITIES**

The Armstrong Laboratory conducts RDT&E at Wright-Patterson AFB OH, Brooks AFB TX, and Williams AFB AZ, but most of the equipment and facilities are located at Wright-Patterson and Brooks Air Force bases. Equipment and facilities include: two human centrifuges for acceleration and spatial disorientation research; a cardiac catheterization suite for cardiology research and aeromedical evaluations; anechoic chambers for study of sound and noise; "virtual worlds" for systems and training research; inhalation toxicology chambers; a directed energy facility for research of bioeffects of lasers and RF radiation; a facility for controlled study of group dynamics and teamwork in simulated air operations; a TEMPEST secure facility with simulators for EW research and training; and a facility for using recruits as test subjects in RDT&E of computer automated training and force management tools.

**Armstrong Laboratory**  
 San Antonio, TX 78235-5118  
 (210) 536-3966

Director: Dr. Brendan B. Godfrey  
 Deputy Director: Col Richard F. Jones

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.100	NA	0.100
6.1 Other	2.400	3.500	5.900
6.2 IED (Navy)	NA	NA	NA
6.2 Other	35.100	41.800	76.900
6.3	0.700	55.600	56.300
<b>Subtotal (S&amp;T)</b>	<b>38.300</b>	<b>100.900</b>	<b>139.200</b>
6.4	0.000	9.700	9.700
6.5	0.000	12.300	12.300
6.6	0.000	0.000	0.000
6.7	0.000	0.000	0.000
Non-DOD	0.000	4.900	4.900
<b>TOTAL RDT&amp;E</b>	<b>38.300</b>	<b>127.800</b>	<b>166.100</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.000	0.000	0.000
Other	0.200	21.800	22.000
<b>TOTAL FUNDING</b>	<b>38.500</b>	<b>149.600</b>	<b>188.100</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

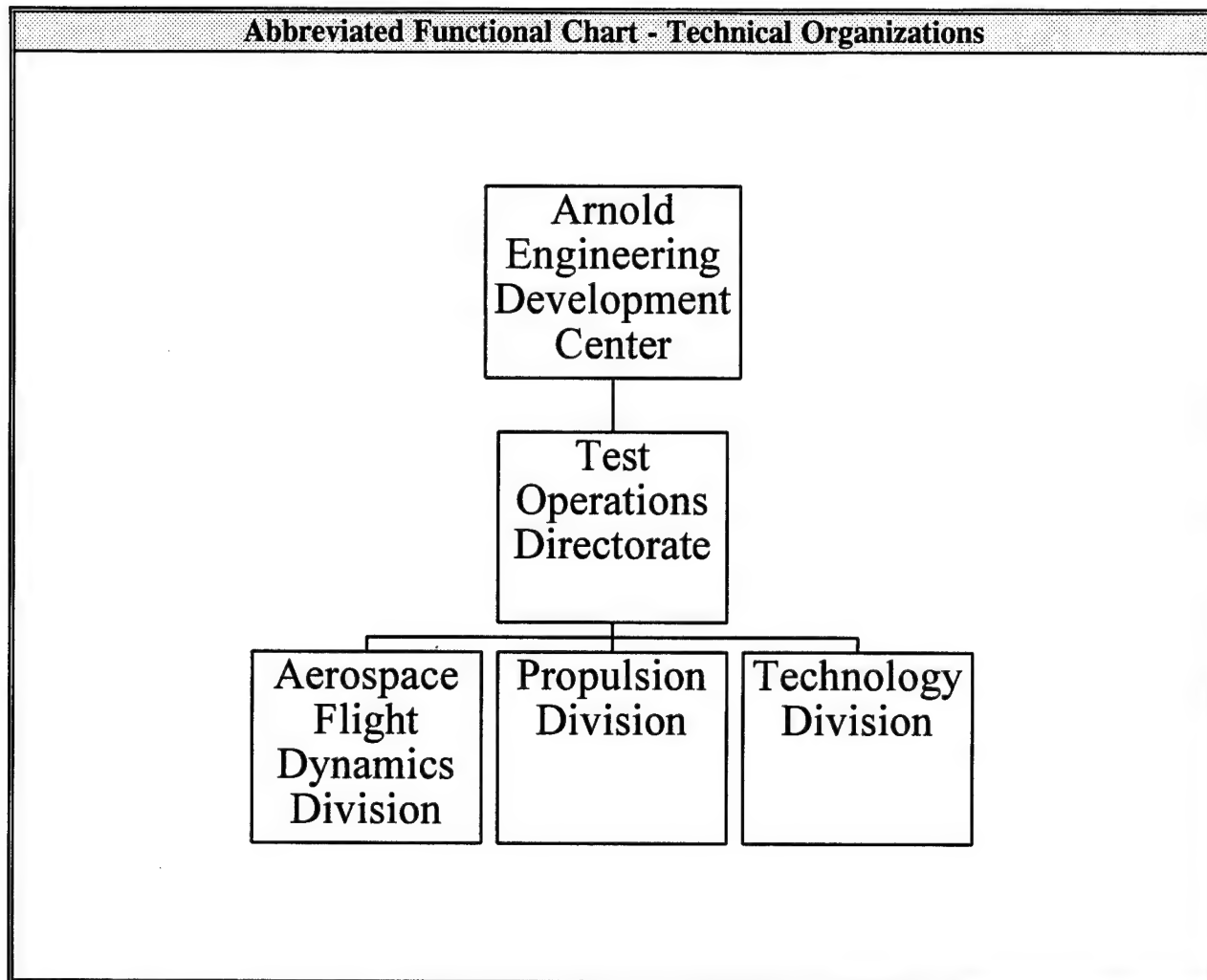
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	497	75	144	278
CIVILIAN	533	136	135	262
<b>TOTAL</b>	<b>1,030</b>	<b>211</b>	<b>279</b>	<b>540</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	727.000	<b>REAL PROPERTY</b>	63.400
ADMIN	32.000	* NEW CAPITAL EQUIPMENT	4.400
OTHER	149.000	<b>EQUIPMENT</b>	71.100
<b>TOTAL</b>	<b>908.000</b>	* NEW SCIENTIFIC & ENG. EQUIP.	4.392
<b>ACRES</b>	<b>75</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Arnold Engineering Development Center



**Arnold Engineering Development Center**

Arnold Air Station, TN 37389-5000  
(615) 454-5201

Commander: Col Lawrence P. Graviss  
Director of Operations: John M. Rampy

**MISSION**

Test aircraft, missile, and space systems and subsystems at the flight conditions they will experience during a mission. AEDC conducts a research and technology program to develop advanced testing techniques and instrumentation, and to support the development of new test facilities. AEDC supports DoD, other Government agencies, private sector companies, and foreign military sales.

**CURRENT IMPORTANT PROGRAMS**

The most significant programs supported by AEDC in FY 94 are:

1. The F-22 fighter and F-119 engine
2. The F/A-18 fighter
3. Theater Missile Defense
4. The F-15E fighter
5. Seek Eagle
6. The B-1 Bomber
7. Classified Projects
8. Pratt-Whitney 4084 Commercial Engine
9. Rolls Royce Trent 800 Commercial Engine

**EQUIPMENT/FACILITIES**

Included are wind tunnels with sections to 16 ft. and speeds from subsonic to Mach 20; turbine engine test cells which provide simulation to Mach 3; rocket test cells, the largest rated at .5 million lbs. thrust at altitude; dust and snow erosion facilities; a bird impact facility; and two captive trajectory systems. These facilities have supported development and qualification of most major aeronautical, missile, and space systems since 1954. This testing complements expensive and often hazardous flight testing, and assures that system deficiencies are found early, saving time and resources in the overall development, acquisition, and deployment process.

**Arnold Engineering Development Center**

Arnold Air Station, TN 37389-5000

(615) 454-5201

Commander: Col Lawrence P. Graviss

Director of Operations: John M. Rampy

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.000	0.031	0.031
6.3	0.000	0.774	0.774
<b>Subtotal (S&amp;T)</b>	<b>0.000</b>	<b>0.805</b>	<b>0.805</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	185.712	62.411	248.123
6.7	0.782	1.328	2.110
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>186.494</b>	<b>64.544</b>	<b>251.038</b>
Procurement	1.161	2.498	3.659
Operations & Maintenance	8.149	0.473	8.622
Other	7.214	34.006	41.220
<b>TOTAL FUNDING</b>	<b>203.018</b>	<b>101.521</b>	<b>304.539</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	1.500

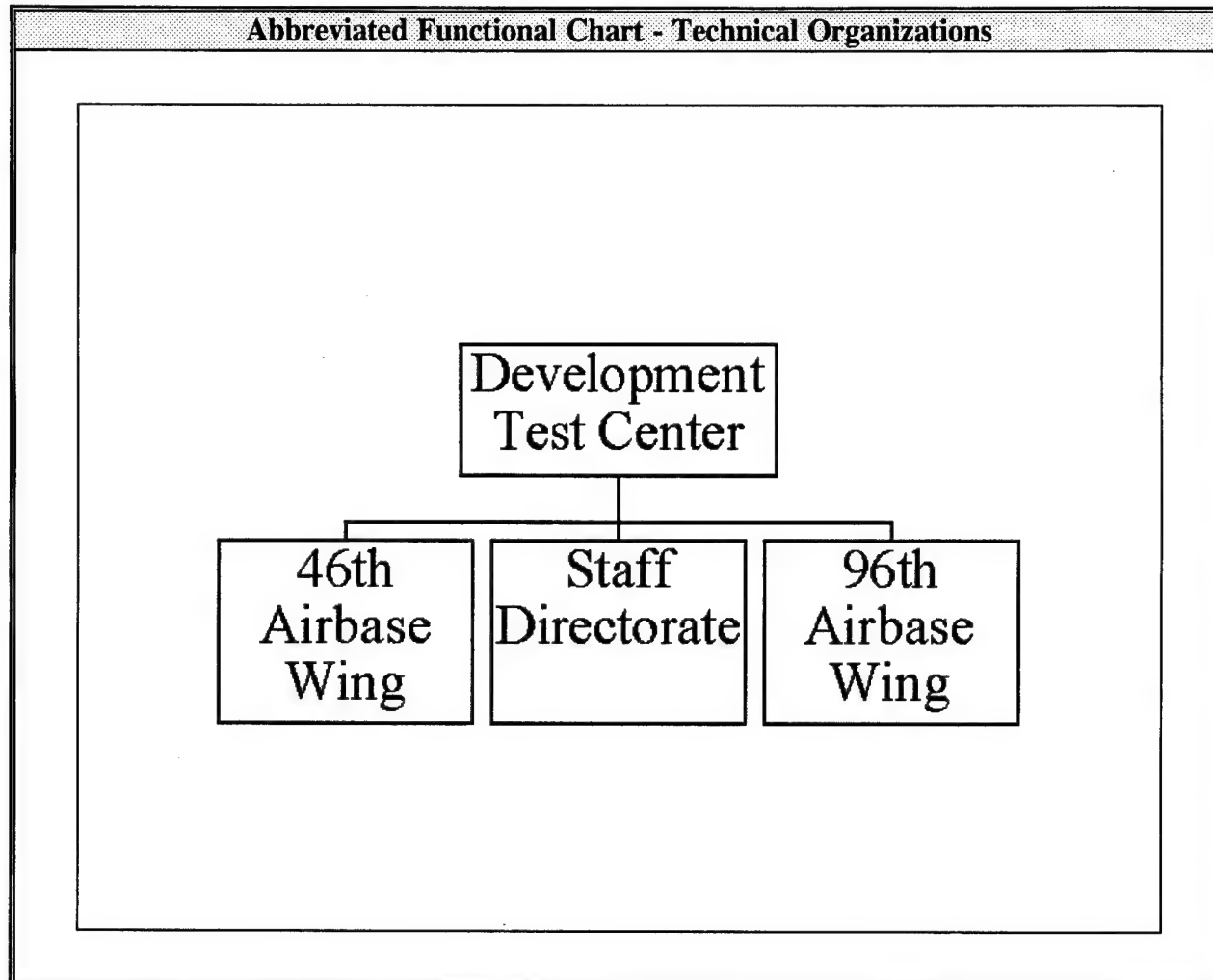
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	117	1	57	59
CIVILIAN	236	2	61	173
<b>TOTAL</b>	<b>353</b>	<b>3</b>	<b>118</b>	<b>232</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	1,614.697	<b>REAL PROPERTY</b>	1,269.562
ADMIN	370.161	* NEW CAPITAL EQUIPMENT	0.000
OTHER	684.564	<b>EQUIPMENT</b>	225.808
<b>TOTAL</b>	<b>2,669.422</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>39,081</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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Development Test Center



**Development Test Center**  
Eglin AFB, FL 32542-5498  
(904) 882-3931

Commander: MG Stewart E. Cranston  
Exec. Director: Dr. J. Daniel Stewart

### MISSION

Air Force Development Test Center (AFDTC) plans, tests, and evaluates munitions, electronic systems, electronic combat systems and support equipment, and their integration into weapons systems. The major mission areas assigned to AFDTC are test and evaluation of non-nuclear armament and electronic combat systems, and host-base and range support.

### CURRENT IMPORTANT PROGRAMS

The following are some of the more important programs on which AFDTC is working:

AMRAAM\*  
Hellfire  
Chicken Little\*\*  
Joint Stars  
Seek Eagle  
F-15E TEWS  
Sensor Fuse Weapons  
JTIDS  
JDAM\*  
JSOW\*  
AIM - 9X  
ASRAAM  
Various Allied Weapons

\* Navy & Air Force Joint Programs

\*\* Army & Air Force Joint Program

**EQUIPMENT/FACILITIES**

Equipment and facilities include: Climatic testing facility; Simulation facilities; Gun test facility; Security systems test facility; Damage potential sled track; Time-space-position instrumentation facilities; Telemetry systems facilities; Data handling facilities; Marine operations facilities; Photographic laboratory; Weather characterization facilities; Land test ranges; Gulf water test areas; Laser ranging/tracking facilities; Frequency control and analysis facilities; Electro-optical systems facilities (ground and airborne); and Aircraft maintenance (test associated) facilities.

Development Test Center  
 Eglin AFB, FL 32542-5498  
 (904) 882-3931

Commander: MG Stewart E. Cranston  
 Exec. Director: Dr. J. Daniel Stewart

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.000	0.000	0.000
6.3	0.000	0.000	0.000
<b>Subtotal (S&amp;T)</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
6.4	0.000	0.000	0.000
6.5	3.195	45.305	48.500
6.6	180.958	34.242	215.200
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>184.153</b>	<b>79.547</b>	<b>263.700</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	4.027	17.084	21.111
Other	39.328	9.832	49.160
<b>TOTAL FUNDING</b>	<b>227.508</b>	<b>106.463</b>	<b>333.971</b>

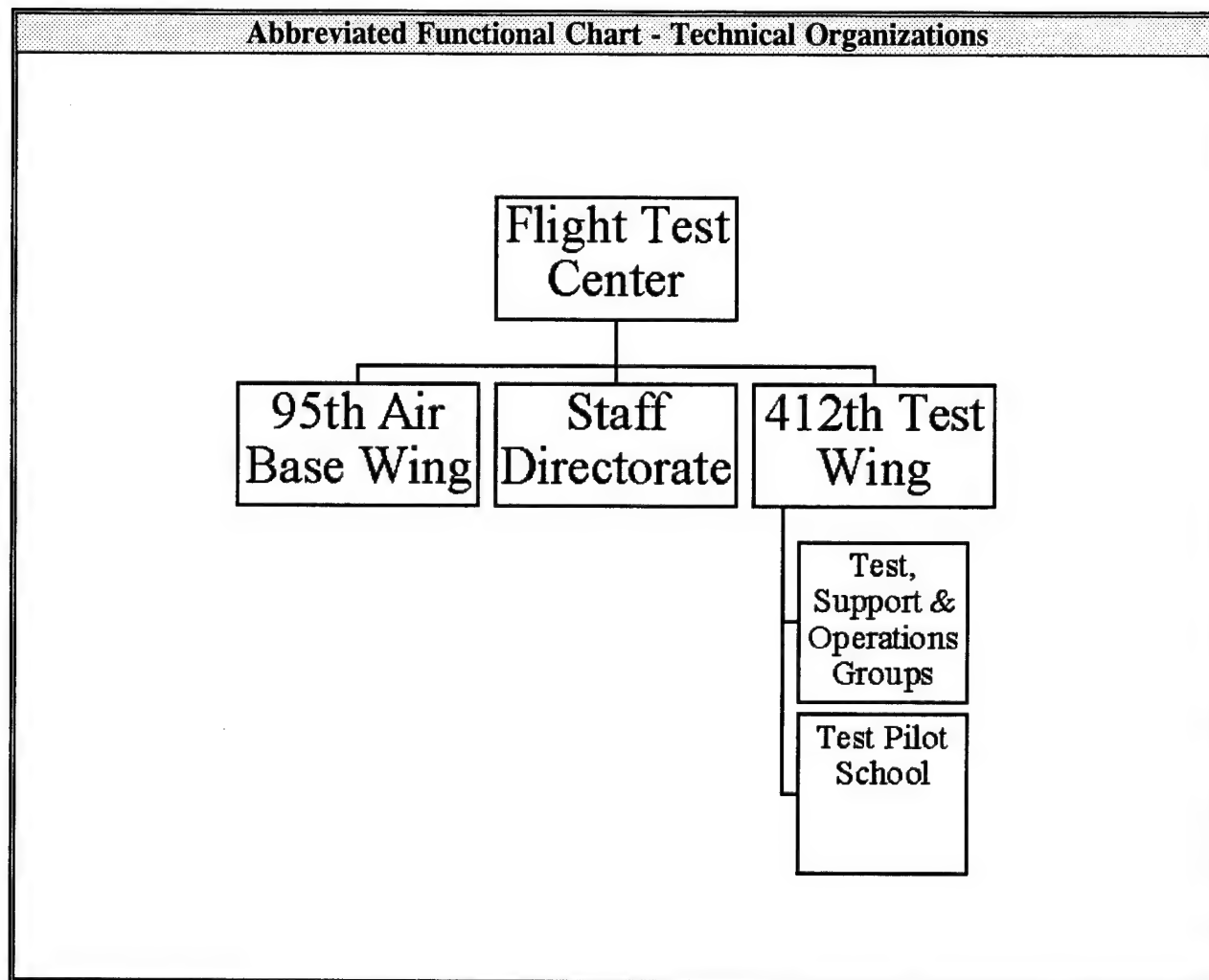
MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	37.3

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	3,387	0	75	3,312
CIVILIAN	2,698	4	347	2,347
<b>TOTAL</b>	<b>6,085</b>	<b>4</b>	<b>422</b>	<b>5,659</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	333.722	<b>REAL PROPERTY</b>	638.156
ADMIN	792.293	* NEW CAPITAL EQUIPMENT	0.000
OTHER	11,567.328	<b>EQUIPMENT</b>	457.990
<b>TOTAL</b>	<b>12,693.343</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>463,448</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## Flight Test Center



**Flight Test Center**

Edwards AFB, CA 93524-1000  
(805) 277-3837

Commander: BG Richard L. Engel  
Exec. Director: Richard L. Hildebrand

**MISSION**

The Air Force Flight Test Center (AFFTC) is charged with supporting the Air Force Materiel Command (AFMC) mission by conducting and supporting testing of both manned and unmanned aerospace vehicles. This mission involves not only all aspects of testing of air vehicles, but includes the flight evaluation and recovery of research vehicles, development testing of aerodynamic decelerators, and the operation of the Air Force Test Pilot School. To support this testing the AFFTC operates and manages the Edwards Flight Test Range and the Utah Test and Training Range. The Center operates a fleet of test bed aircraft for early development and check out of new avionics and Advance Range Instrumentation Aircraft (ARIA) worldwide in support of a variety of space and missile tests. The center supports and participates in test and evaluation programs for the Air Force other Departments of Defense, other government agencies, as well as for contractors and foreign governments.

**CURRENT IMPORTANT PROGRAMS**

The following are some of the current important programs on which the AFFTC is working: B-2 development; AC-130U gunship qualification and test and evaluation program; C-17 transport development; B-1B follow-on development; F-117 development; F-15 follow-on development; F-16 follow-on development; LANTRIN follow-on development; BIG CROW; TSSAM mission support; Advance Range Instrumentation Aircraft; B-1B Conventional weapons upgrade; U-2 follow-on development; M-130 development; and F-22 development.

**EQUIPMENT/FACILITIES**

Major unique facilities and equipment include: Integrated Facility for Avionics System Test (IFAST); Benet field anechoic facility; Real time mission control facility; Precision impact range area used for bombing/gunnery/infrared systems integration; Personnel and cargo parachute drop zones; Hydrant refueling system for heavy aircraft; Aircraft weight and Balance facility complex; R-2508 restricted airspace; Photo/video lab for airborne and ground testing; Intermediate aircraft maintenance support capability; Pacer Comet jet engine test facility; Horizontal aircraft thrust stand; Photo resolution range; Instrumented low level terrain following course; and Aircraft gun system harmonization range (GUNBUTT).

## Flight Test Center

Edwards AFB, CA 93524-1000  
(805) 277-3837

Commander: BG Richard L. Engel  
Exec. Director: Richard L. Hildebrand

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.000	0.000	0.000
6.3	0.000	0.000	0.000
<b>Subtotal (S&amp;T)</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
6.4	0.000	0.000	0.000
6.5	0.000	31.468	31.468
6.6	131.360	94.764	226.124
6.7	0.088	0.038	0.126
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>131.448</b>	<b>126.270</b>	<b>257.718</b>
Procurement	0.000	4.024	4.024
Operations & Maintenance	13.662	31.371	45.033
Other	184.349	11.266	195.615
<b>TOTAL FUNDING</b>	<b>329.459</b>	<b>172.931</b>	<b>502.390</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	16.300

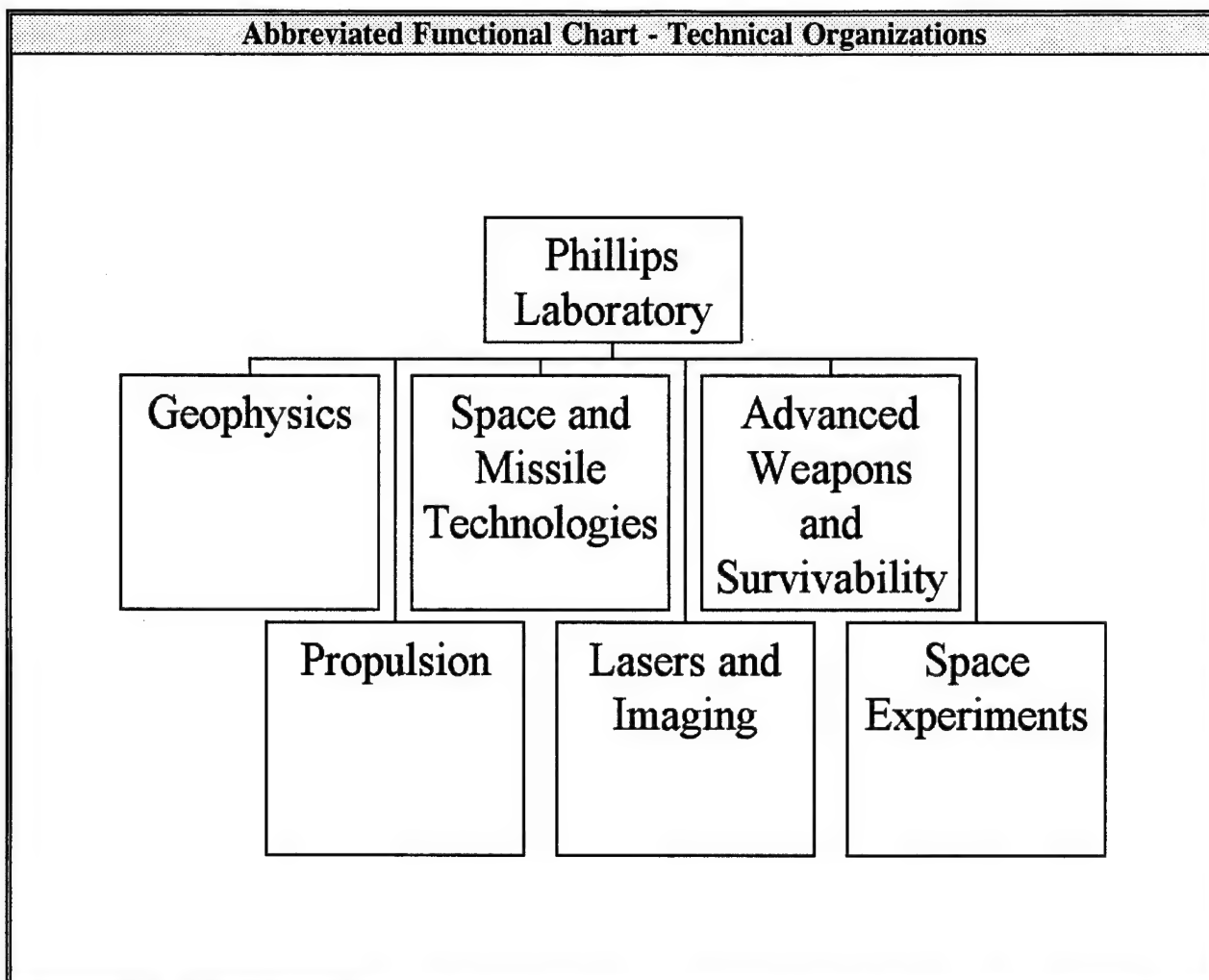
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	5,245	53	1,136	4,056
CIVILIAN	4,163	14	683	3,466
<b>TOTAL</b>	<b>9,408</b>	<b>67</b>	<b>1,819</b>	<b>7,522</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	303.366	<b>REAL PROPERTY</b>	711.232
ADMIN	276.,284	* NEW CAPITAL EQUIPMENT	0.000
OTHER	8,834.074	<b>EQUIPMENT</b>	0.299
<b>TOTAL</b>	<b>9,413.724</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>297,685</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## Phillips Laboratory



**Phillips Laboratory**

Kirtland AFB, NM 87117-5776  
(505) 846-4583

Commander: Colonel Richard W. Davis  
Chief Scientist: Dr Joseph Janni

**MISSION**

Phillips Laboratory Leads, Develops, Focuses, and Transitions Military Space and Missile Technologies, with corporate responsibility for Directed Energy and Geophysics Technologies Extending beyond their Space Applications.

**CURRENT IMPORTANT PROGRAMS**

The following are some of the current important programs (thrusts) on which the laboratory is working: (a) Space & Missile Technology-- Advanced Space Technology Integration & Demonstration, Missile Propulsion Technology, Space Systems Propulsion Technology, Space Vehicle and Missile Dynamics Technology, Space Vehicle Power and Thermal Management; (b)

Advanced Weapons--Laser Technology, High Power Microwave (HPM), Space System Survivability; and (c) Geophysics --Geophysics for Environmental Quality, Geophysics for Synthetic Environments, Ionospheric Effects on Air Force Systems, Space Effects on Air Force Systems, Terrestrial Effects on Air Force Systems, Weather Impact on Air Force Systems.

**EQUIPMENT/FACILITIES**

Primary operating locations are: Kirtland AFB NM, Edwards AFB CA, and Hanscom AFB MA. Equipment and facilities include: Component development lab; Starfire optical range; Developmental optics facility; Malabar test facility; Air Force Maui optical station; Argus aircraft; Chemical laser facility; Semiconductor and diode laser facilities; Payload integration facility; RF spectrum analyzer; Balloon launch facility; Area 53-classified Sun computer network; Two (2) electrical discharge coaxial lasers; Cryogenic hydrogen supply system; High energy microwave lab; High frequency research facility; Fixed and portable PC-controlled data acquisition systems; Sleet database for EM data archive and manipulation; High power narrowband and ultra-wideband system; Shiva Star capacitor bank; Space simulation chambers; and Two (2) KC-135 aircraft for optical, upper atmospheric studies.

**Phillips Laboratory**

Kirtland AFB, NM 87117-5776  
(505) 846-4583

Commander: Colonel Richard W. Davis  
Chief Scientist: Dr Joseph Janni

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.243	NA	0.243
6.1 Other	10.432	5.368	15.800
6.2 IED (Navy)	NA	NA	NA
6.2 Other	16.640	110.145	126.785
6.3	61.891	201.873	263.764
<b>Subtotal (S&amp;T)</b>	<b>89.206</b>	<b>317.386</b>	<b>406.592</b>
6.4	1.680	1.680	3.360
6.5	0.000	26.485	26.485
6.6	0.000	0.000	0.000
6.7	0.000	0.000	0.000
Non-DOD	1.169	6.623	7.792
<b>TOTAL RDT&amp;E</b>	<b>92.055</b>	<b>352.174</b>	<b>444.229</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	1.383	0.000	1.383
Other	34.131	57.593	91.724
<b>TOTAL FUNDING</b>	<b>127.569</b>	<b>409.767</b>	<b>537.336</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

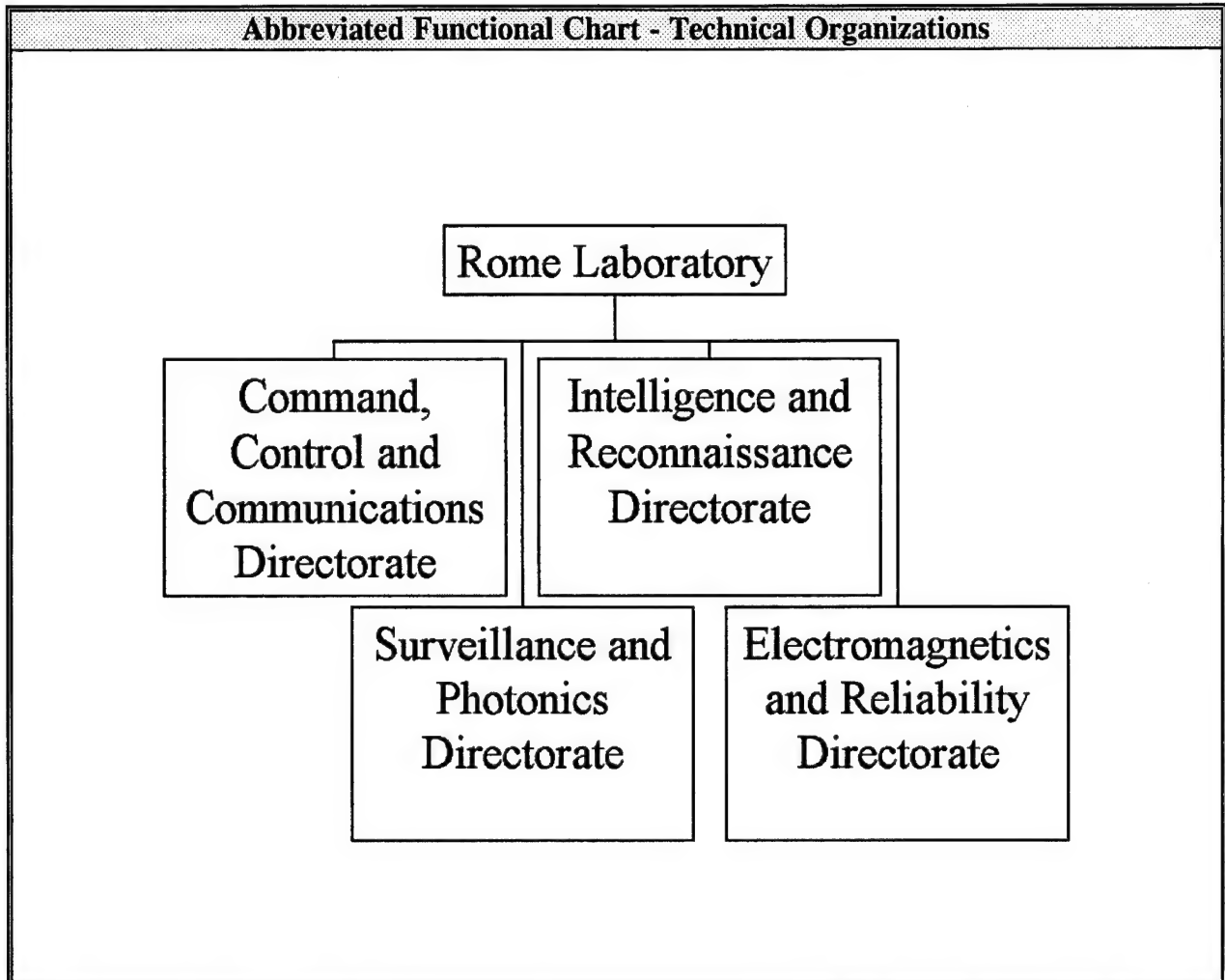
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	638	40	323	275
CIVILIAN	1,265	224	407	634
<b>TOTAL</b>	<b>1,903</b>	<b>264</b>	<b>730</b>	<b>909</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	1,935.400	<b>REAL PROPERTY</b>	181.000
ADMIN	470.300	* NEW CAPITAL EQUIPMENT	31.000
OTHER	1,310.700	<b>EQUIPMENT</b>	1,099.000
<b>TOTAL</b>	<b>3,716.400</b>	* NEW SCIENTIFIC & ENG. EQUIP.	241.500
<b>ACRES</b>	<b>5,000</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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**Rome Laboratory**



**Rome Laboratory**

Griffiss AFB, NY 13441-4514  
(315) 330-7701

Commander: Colonel Paul D. Nielsen  
Deputy Director: Mr. Raymond P. Urtz

**MISSION**

The mission of Rome Laboratory is to advance the state-of-the-art of science and technology in command, control, communications and intelligence (C3I) and to transition these technologies into systems to meet customer needs. To achieve this, Rome Laboratory:

- a. Conducts vigorous research, development, and test programs in all applicable technologies;
- b. Transitions technology to current and future systems to improve operational capability, readiness, and supportability;
- c. Provides a full range of technical support to Air Force Materiel Command product centers and other Air Force organizations;
- d. Conducts selected acquisition programs for low-volume, limited quantity intelligence and software systems; and
- e. Promotes transfer of technology to the private sector.

Rome lab support this mission by maintaining leading-edge technological expertise in the areas of surveillance, communications, command and control, intelligence, reliability science, advanced electromagnetic technology, photonics, signal processing, and computer science and technology.

**CURRENT IMPORTANT PROGRAMS**

The following are some of the current important programs/thrusts on which the laboratory is working: Low observable surveillance; Secure survivable communications, e.g. Joint Multi-Band Multi-Mode Radio; Battle information management and decision aids; Non-cooperative target identification; Signal processing; Artificial intelligence, e.g. Knowledge Based Software Assistant; Distributed computing systems; Multi-level secure information systems; Photonics; Intelligence processing; and Reliability assessment:

**EQUIPMENT/FACILITIES**

Primary operating locations are: Hanscom AFB, MA and Griffiss AFB, NY. Equipment and facilities include: Reconnaissance exploitation facility; Photonics facility; Electronic Intelligence (ELINT) development facility; Electronic Counter-Countermeasures (ECCM) and signal processing facility; Solid state device failure analysis facility; Command and control technology center; Communications experimental facility; Radio transmission facility; Electro-magnetic vulnerability facility; Surveillance facility; Audio/speech processing facility; Materials synthesis and development facility; Intelligence Information Processing Facility (IIPF); Multisensor fusion testbed; Experimental device fabrication facility; Imagery data base facility; Network design facility; Distributed systems evaluation environment testbed; Software engineering and artificial intelligence facility; and a variety of antenna test facilities.

**Rome Laboratory**

Griffiss AFB, NY 13441-4514  
(315) 330-7701

Commander: Colonel Paul D. Nielsen  
Deputy Director: Mr. Raymond P. Urtz

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.041	NA	0.041
6.1 Other	3.814	9.843	13.657
6.2 IED (Navy)	NA	NA	NA
6.2 Other	49.764	65.105	114.869
6.3	1.581	25.038	26.619
<b>Subtotal (S&amp;T)</b>	<b>55.200</b>	<b>99.986</b>	<b>155.186</b>
6.4	9.898	80.083	89.981
6.5	1.358	15.620	16.978
6.6	0.164	16.221	16.385
6.7	0.000	5.181	5.181
Non-DOD	0.239	0.938	1.177
<b>TOTAL RDT&amp;E</b>	<b>66.859</b>	<b>218.029</b>	<b>284.888</b>
Procurement	0.016	14.531	14.547
Operations & Maintenance	3.592	63.828	67.420
Other	7.245	0.203	7.448
<b>TOTAL FUNDING</b>	<b>77.712</b>	<b>296.591</b>	<b>374.303</b>

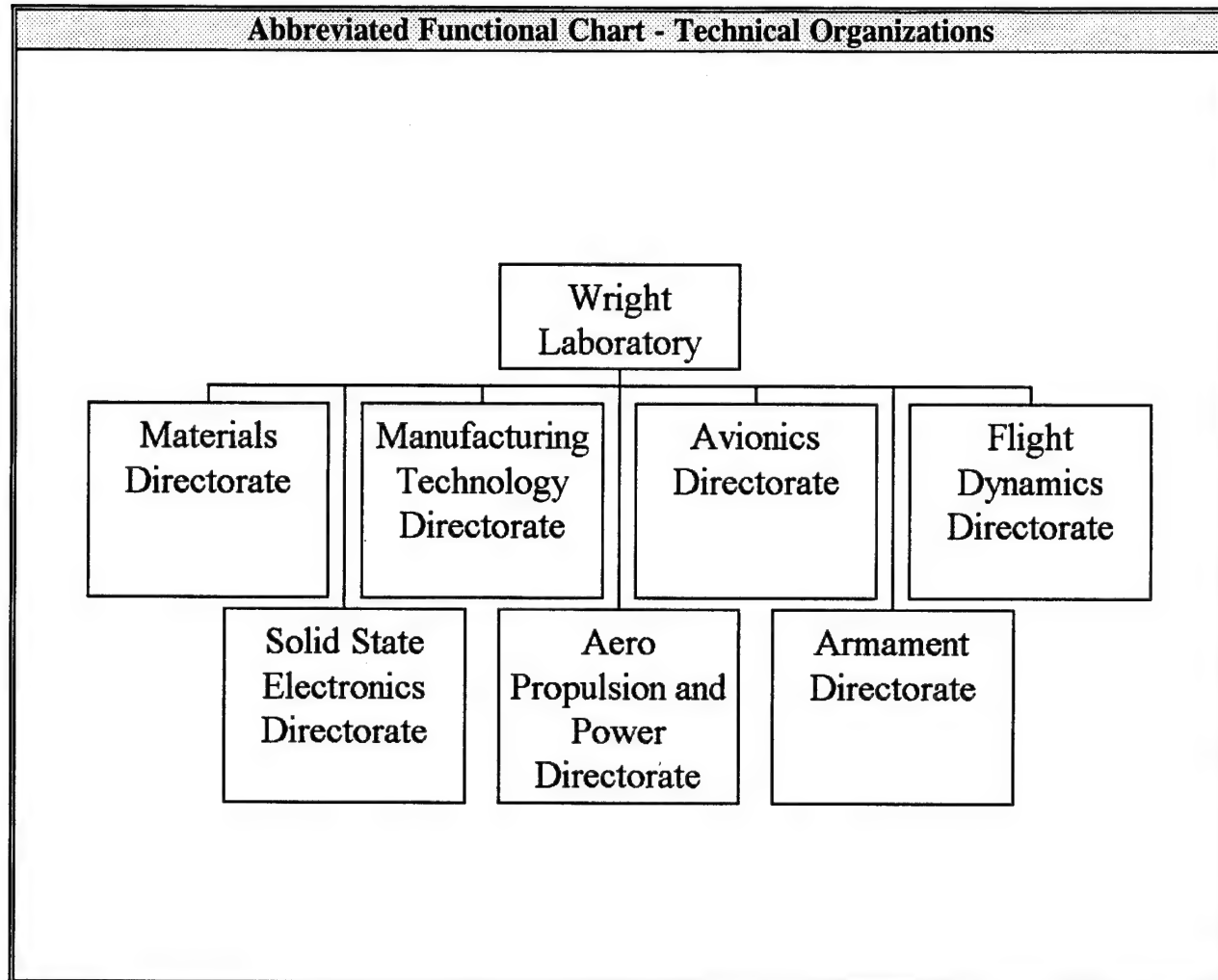
MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	114	9	64	41
CIVILIAN	860	68	469	323
<b>TOTAL</b>	<b>974</b>	<b>77</b>	<b>533</b>	<b>364</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	855.546	<b>REAL PROPERTY</b>	46.892
ADMIN	89.231	* NEW CAPITAL EQUIPMENT	0.000
OTHER	44.247	<b>EQUIPMENT</b>	137.400
<b>TOTAL</b>	<b>989.024</b>	* NEW SCIENTIFIC & ENG. EQUIP.	10.000
<b>ACRES</b>	<b>1,612</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## Wright Laboratory



**Wright Laboratory**  
WPAFB, OH 45433-7542  
(513) 255-4119

Commander: Colonel David A. Herrelko  
Deputy Director: Mr. O. Lester Smithers Jr.

### MISSION

To lead and focus the Air Force's aeronautical technology investment by performing in-house research and establishing contracts and partnerships with industry and universities to: Discover enabling technologies that offer potential for revolutionary improvements in the performance, affordability, and supportability of Air Force weapon systems; Develop and demonstrate advanced technologies for both current and future Air Force weapon systems to best meet user needs. Transition proven technologies to weapon system developers and maintainers in an aggressive, expeditious manner; Solve pressing technical problems wherever they occur through responsive support to any Air Force organization, 24 hours a day, in times of peace or war.

### CURRENT IMPORTANT PROGRAMS

The following are some of the current important programs/thrusts on which the laboratory is working:

- Aeropropulsion and Power Technology;
- Air Vehicles Technology;
- Avionics and Solid State Devices Technology;
- Conventional Armament Technology;
- Materials Technology; and
- Manufacturing Technology.

### EQUIPMENT/FACILITIES

Primary operating locations are: Wright-Patterson AFB OH and Eglin AFB FL. Equipment and facilities include: Turbine Research Laboratory; Compressor Research Facility; Integrated electromagnetic system simulator; In-flight simulator; Subsonic aerodynamic research laboratory; Device research laboratory; Sensor evaluation facility; Targeting systems characterization facility; Electro-optics research facilities; Large amplitude motion simulator; Structure testing facility; DoD landing gear development facility; Aircraft survivability research facility; Laser hardened material evaluation lab; Ramjet combustion research facility; Combustion research facilities; Compressor test facility; High explosive R&D facility; Hypervelocity launcher experiment facility; and Aeroballistics research facility.

**Wright Laboratory**  
 WPAFB, OH 45433-7542  
 (513) 255-4119

Commander: Colonel David A. Herrelko  
 Deputy Director: Mr. O. Lester Smithers Jr.

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.300	NA	0.300
6.1 Other	11.000	11.600	22.600
6.2 IED (Navy)	NA	NA	NA
6.2 Other	97.000	255.600	352.600
6.3	29.800	502.700	532.500
<b>Subtotal (S&amp;T)</b>	<b>138.100</b>	<b>769.900</b>	<b>908.000</b>
6.4	0.500	16.900	17.400
6.5	1.400	35.300	36.700
6.6	0.000	56.600	56.600
6.7	0.000	0.000	0.000
Non-DOD	1.400	9.300	10.700
<b>TOTAL RDT&amp;E</b>	<b>141.400</b>	<b>888.000</b>	<b>1,029.400</b>
Procurement	0.000	5.400	5.400
Operations & Maintenance	0.700	0.000	0.700
Other	14.000	14.000	28.000
<b>TOTAL FUNDING</b>	<b>156.100</b>	<b>907.400</b>	<b>1,063.500</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

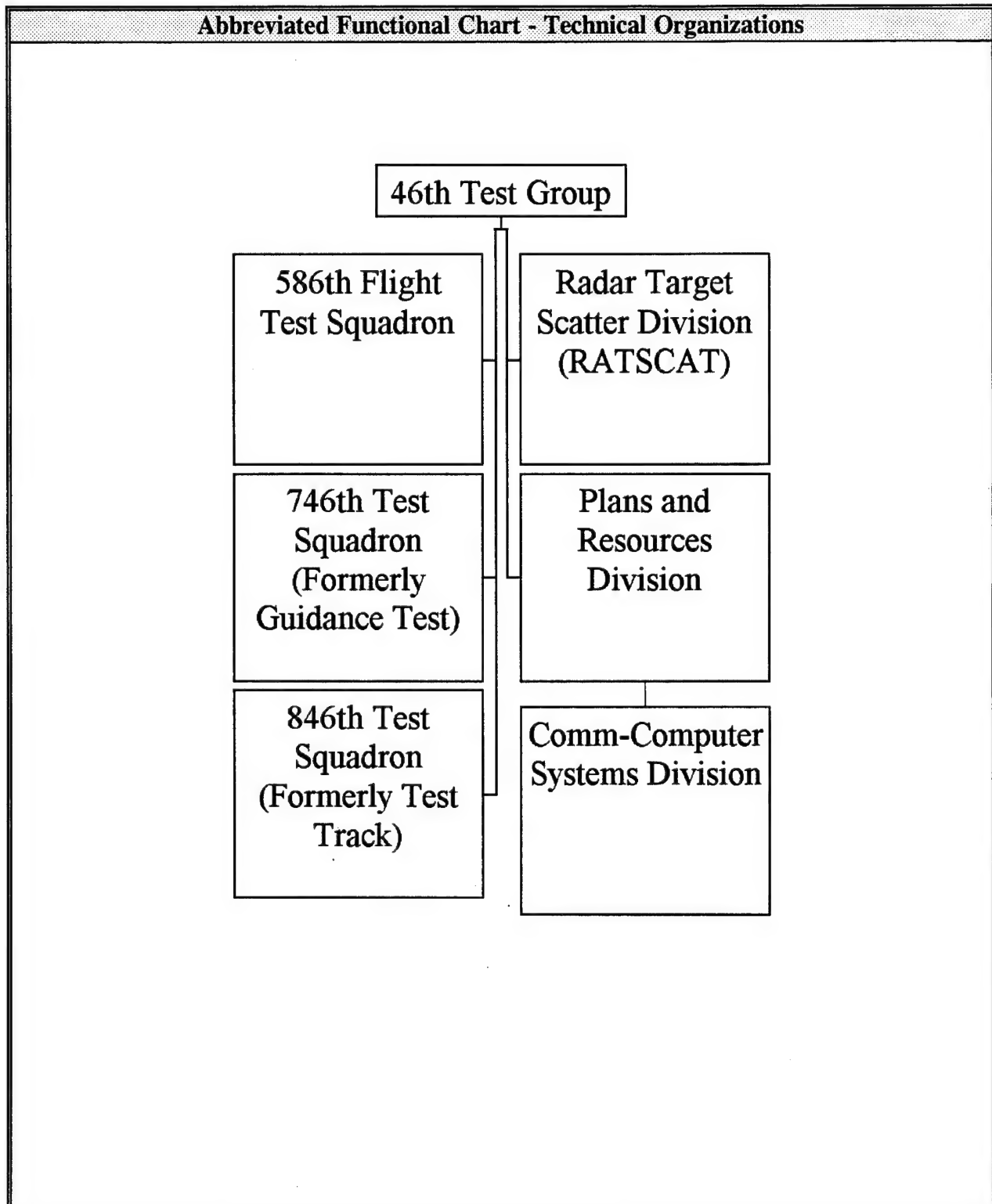
PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	376	37	269	70
CIVILIAN	2,090	198	1,264	628
<b>TOTAL</b>	<b>2,466</b>	<b>235</b>	<b>1,533</b>	<b>698</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	1,435.300	<b>REAL PROPERTY</b>	816.734
ADMIN	791.614	* NEW CAPITAL EQUIPMENT	2.900
OTHER	904.691	<b>EQUIPMENT</b>	2,069.390
<b>TOTAL</b>	<b>3,131.605</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>932</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

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## 46th Test Group



**46th Test Group**

Holloman AFB, NM 88330-7715  
(505) 475-1368

Commander: Colonel Thomas U. Mead  
Technical Dir.: Mr. Kenneth R. Holland

**MISSION**

Operates the world's premier facilities for measuring radar signatures, testing missile guidance systems, testing aircraft navigation systems, and testing armaments and escape systems on the high speed test track. Conducts flight testing of the nation's highest-priority air-to-air missile systems. Provides airspace control for the White Sands Missile Range (WSMR).

**CURRENT IMPORTANT PROGRAMS**

The 46 TG is supporting programs such as hypersonic lethality testing for Theater Missile Defense (TMD), Crew Escape System Technology (CREST) tests, Global Positioning System (GPS) integration for all mandated DoD weapon systems, field tests of the Federal Aviation Administration's (FAA) GPS navigational and landing aids, and electromagnetic testing including radar cross section and antenna pattern measurements of such advanced systems as the B-2, the Advanced Cruise Missile, and the Advanced Tactical Fighter.

**EQUIPMENT/FACILITIES**

Equipment and facilities include: A. High Speed Test Track (HSTT): the world's longest sled track (50,788 ft), the Project Reliance lead for all DoD test tracks, and the Center of Excellence for ejection seat testing. The HSTT supports sled speeds exceeding Mach 8 and accelerations up to 200G for aerodynamic tests, impact tests, and missile simulations in various controlled environments of rain, particle, and blast/shock wave; B. Central Inertial Guidance Test Facility (CIGTF): America's most seismically stable (0.01 micro G isolated background level) test bed for truth reference validation of navigation systems. CIGTF has the largest collection of precision rate tables (10), multi-axis tables (12), and precision centrifuges (3) in DoD; C. Radar Target Scatter (RATSCAT) Mainsite and RATSCAT Advanced Measurement System (RAMS): America's only site capable of low observable, monostatic/bistatic RCS measurement for full-scale and sub-scale systems--up to 100,000 lbs at Mainsite and 30,000 lbs at RAMS. Both facilities have computer resources to support RCS target predictions, detection profiles, model validation, and real time diagnostic imaging; and D. 586th Flight Test Squadron: Aircraft support for testing of air-to-air missiles, air-to-ground ordnance, photo/safety chase, inertial navigational systems, and Global Positioning Systems. The squadron owns two T-38's, rents an F-15 and F-16 from Eglin AFB, and rents a C-12 from the Army when needed.

## 46th Test Group

Holloman AFB, NM 88330-7715  
(505) 475-1368

Commander: Colonel Thomas U. Mead  
Technical Dir.: Mr. Kenneth R. Holland

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	0.000	0.000	0.000
6.3	0.000	0.000	0.000
<b>Subtotal (S&amp;T)</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	25.379	42.648	68.027
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>25.379</b>	<b>42.648</b>	<b>68.027</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.000	0.000	0.000
Other	5.892	3.500	9.392
<b>TOTAL FUNDING</b>	<b>31.271</b>	<b>46.148</b>	<b>77.419</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	191	1	25	165
CIVILIAN	296	2	164	130
<b>TOTAL</b>	<b>487</b>	<b>3</b>	<b>189</b>	<b>295</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	572.971	<b>REAL PROPERTY</b>	238.792
ADMIN	55.009	* NEW CAPITAL EQUIPMENT	0.000
OTHER	132.641	<b>EQUIPMENT</b>	157.441
<b>TOTAL</b>	<b>760.621</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.000
<b>ACRES</b>	<b>7,052</b>	* Subset of previous category. See Equip./Facilities Narrative.	

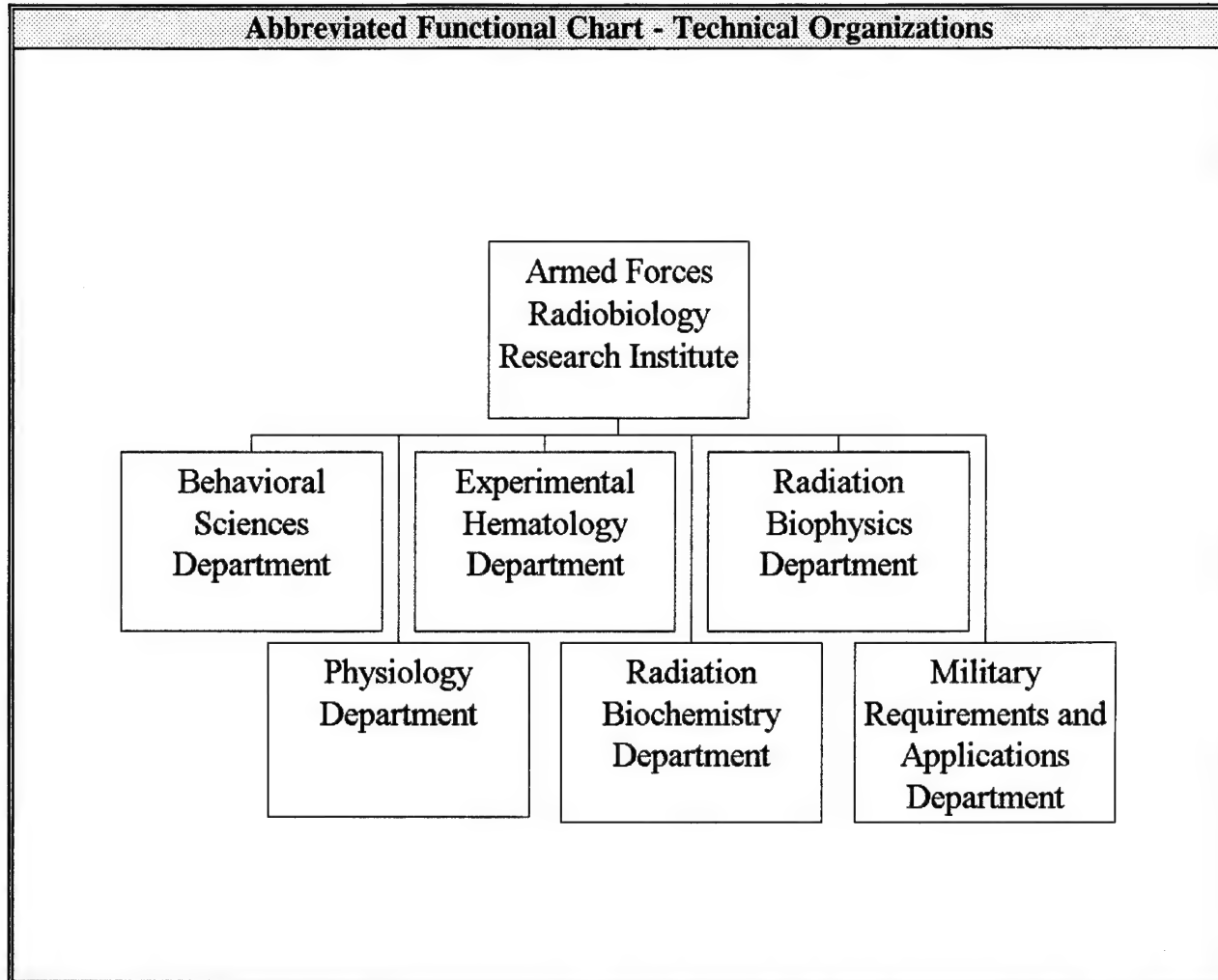
NA = Not Applicable

DEFENSE NUCLEAR AGENCY

**DEFENSE NUCLEAR AGENCY**

The only In-House RDT&E Activity within DNA is the Armed Forces Radiobiology Research Institute (AFRRI).

**Armed Forces Radiobiology Research Institute**



**Armed Forces Radiobiology Research Institute**  
Bethesda, MD 20889-5603  
(301) 295-1210

Director: Captain Robert L. Bumgarner  
Scientific Dir.: Dr. E. John Ainsworth

### MISSION

The mission of Armed Forces Radiobiology Research Institute shall be to conduct research in the field of radiobiology and related matters essential to the operational and medical support of the Department of Defense and military services. The biomedical research program is directed toward acquiring the quantitative and qualitative data necessary for assessing the effects of radiation on man.

### CURRENT IMPORTANT PROGRAMS

Evaluation of early and late effects of radiation exposures at low dose rates.

Impact of imbedded depleted uranium shrapnel on biological systems.

Counterproliferation of weapons of mass destruction.

Determining reliable biodosimetry markers.

Continue to support studies of residents of the Former Soviet Union who were exposed to chronic radiation through environmental contamination.

Optimize combinations of protective agents to promote survival and combat effectiveness following irradiation at high or low dose rates.

Develop medical countermeasures to radiation injuries.

### EQUIPMENT/FACILITIES

Functions: operate facilities for conducting radiobiology research and disseminating results; conduct advanced training; provide analysis consultation on bioeffects of radiation; and perform such other research functions as required. Major equipment includes: pulse and steady state nuclear reactor 300,000-Curie Cobalt-60 irradiator, electron linear accelerator, X-ray and electron microscope. Support services include: measurement of radiation fields, provision and care of laboratory animals, equipment design and fabrication assistance, real-time data acquisition system, television and film documentation of experiments, personnel and environmental monitoring, editorial assistance in report preparation, and a large technical library.

**Armed Forces Radiobiology Research Institute**

Bethesda, MD 20889-5603

(301) 295-1210

Director: Captain Robert L. Bumgarner

Scientific Dir.: Dr. E. John Ainsworth

FY94 FUNDING DATA (MILLIONS \$)			
APPROPRIATION	IN-HOUSE	OUT-OF-HOUSE	TOTAL
<b>RDT&amp;E:</b>			
6.1 ILIR	0.000	NA	0.000
6.1 Other	0.000	0.000	0.000
6.2 IED (Navy)	NA	NA	NA
6.2 Other	9.249	0.000	9.249
6.3	4.719	0.000	4.719
<b>Subtotal (S&amp;T)</b>	<b>13.968</b>	<b>0.000</b>	<b>13.968</b>
6.4	0.000	0.000	0.000
6.5	0.000	0.000	0.000
6.6	0.000	0.000	0.000
6.7	0.000	0.000	0.000
Non-DOD	0.000	0.000	0.000
<b>TOTAL RDT&amp;E</b>	<b>13.968</b>	<b>0.000</b>	<b>13.968</b>
Procurement	0.000	0.000	0.000
Operations & Maintenance	0.000	0.000	0.000
Other	0.945	0.000	0.945
<b>TOTAL FUNDING</b>	<b>14.913</b>	<b>0.000</b>	<b>14.913</b>

MILITARY CONSTRUCTION (MILLIONS \$)	
Military Construction (MILCON)	0.000

PERSONNEL DATA (END OF FISCAL YEAR 1994)				
TYPE	END STRENGTH	SCIENTISTS & ENGINEERS		TECHNICAL SUPPORT & OTHER PERSONNEL
		PHD'S	OTHER	
MILITARY	65	17	10	38
CIVILIAN	129	38	21	70
<b>TOTAL</b>	<b>194</b>	<b>55</b>	<b>31</b>	<b>108</b>

SPACE AND PROPERTY			
SPACE (THOUSANDS OF SQ FT)		PROPERTY ACQUISITION COST (MILLIONS \$)	
LAB	61.750	<b>REAL PROPERTY</b>	14.156
ADMIN	34.257	* NEW CAPITAL EQUIPMENT	0.030
OTHER	23.908	<b>EQUIPMENT</b>	15.612
<b>TOTAL</b>	<b>119.915</b>	* NEW SCIENTIFIC & ENG. EQUIP.	0.296
<b>ACRES</b>	<b>10</b>	* Subset of previous category. See Equip./Facilities Narrative.	

NA = Not Applicable

## APPENDICES

APPENDIX A  
DISESTABLISHMENT, ESTABLISHMENT,  
OR CHANGE IN ORGANIZATION NAME

## APPENDIX A

**DISESTABLISHMENT, ESTABLISHMENT,  
OR CHANGES IN ORGANIZATION NAME  
BETWEEN FY93 AND FY94**

## DEPARTMENT OF THE ARMY

The Army Space and Strategic Defense Command has been found to meet the criteria as an RDT&E organization and therefore has been added to this report.

The Redstone Technical Test Center has been found to meet the criteria as an RDT&E organization and therefore has been added to this report.

The Army Simulation, Training and Instrumentation Command has been found to meet the criteria as an RDT&E organization and therefore has been added to this report.

The **Belvoir Research, Development and Engineering Center** was disestablished.

## DEPARTMENT OF THE NAVY

Effective 1 October 1993, the Naval Training Systems Center, Orlando, FL was consolidated with the **Naval Air Warfare Center** (NAWC) increasing the NAWC business base by approximately \$1,018 million and the civilian end strength by 1,063 in FY-94.

Effective 1 October 1993, the **Naval Civil Engineering Laboratory**, Port Hueneme, CA was consolidated with five other activities of the Naval Facilities Engineering Command to form the Naval Facilities Engineering Services Center (NFESC), Port Hueneme, CA, which appears in this report.

Effective 1 October 1993, the **Naval Explosive Ordnance Disposal Technology Center**, Indian Head, MD was consolidated with other activities of the Naval Sea Systems Command to form the Naval Ordnance Center (NOC). The NOC does not meet the criteria as a DoD RDT&E in-house activity and is not included in this report.

## DEPARTMENT OF THE AIR FORCE

The **4950th Test Wing** has been consolidated with the 412th Test Wing (formerly the 6510th TW) under the **Flight Test Center** at Edwards AFB in California as of July 1994.

## DEPARTMENT OF DEFENSE AGENCIES

No changes

Note: Activities in **bold typeface** were reported in the FY 93 edition of this report as separate Activities.

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APPENDIX B  
DEFINITIONS OF REPORT ELEMENTS

## APPENDIX B DEFINITIONS OF REPORT ELEMENTS

Please note in FY92 and previous years a different numbering scheme was used to label budget activity categories.

**6.1 ILIR** - This is the total obligational authority for research 6.1 (Navy PE=0601152N) In-Laboratory (In-House) Independent Research program elements.

**6.1 Other In-House/Out-of-House** - This is the total obligational authority for Research 6.1 program elements conducted In-House (excluding ILIR) or Out-of-House

**6.2 IED In-House/Out-of-House (for Navy only)** - This is the total obligational authority for Innovative Exploratory Development 6.2 (Navy PE=0602936N) program elements conducted In-House/Out-of-House (Eliminated after FY 93).

**6.2 Other In-House/Out-of-House** - This is the total obligational authority for exploratory development 6.2 program elements conducted In-House (excluding IED)/Out-of-House (excluding IED).

**6.3 (previously 6.3A) In-House/Out-of-House** - This is the total obligational authority for Advanced Development 6.3 program elements conducted In-House/Out-of-House.

**6.4 (previously 6.3B) In-House/Out-of-House** - This is the total obligational authority for Demonstration and Validation (Dem/Val) 6.4 program elements conducted In-House/Out-of-House.

**6.5 (previously 6.4) In-House/Out-of-House** - This is the total obligational authority for Engineering and Manufacturing Development (EMD) 6.5 program elements conducted In-House/Out-of-House.

**6.6 (previously 6.5) In-House/Out-of-House** - This is the total obligational authority for RDT&E Management Support 6.6 program elements conducted In-House/Out-of-House.

**6.7 In-House/Out-of-House** - This is the total obligational authority for all Operational Systems Development (OSD) 6.7 with RDT&E funds conducted In-House/Out-of-House. This item is interpreted in its broadest sense to include operational developments outside the systems areas, and not included in any of the above categories.

**Acres** - This is the total number of acres fee-owned and/or acres leased from other than DoD activities. Included is land which is public domain. In cases involving tenants who are also R&D Activities, the tenants will have indicated only the acreage occupied solely by them. The owning Activity will account for the remainder including any acreage occupied by non-R&D tenants. This amount excludes all easements and permits, and is rounded to the nearest acre.

## APPENDIX B DEFINITIONS OF REPORT ELEMENTS

**End Strength, Military/Civilian** - This is the total year end strength, for both officer and enlisted military personnel and civilians (including foreign nationals). Summer hires, co-ops, students, and patients are excluded.

**Equipment - Property Acquisition Cost** - This is the total acquisition cost of all "personal property" equipment, which includes the cost of installed equipment directly related to mission execution, such as lab test equipment. This total includes the acquisition cost of new scientific and engineering equipment. Each reporting Activity is responsible for reporting this information for those facilities assigned to, or occupied and utilized by it. An R&D owner does not report this information for the facilities assigned to or occupied by its R&D tenants, as tenants report this information separately. Installed equipment reported under **Real Property - Property Acquisition Cost** is not included here.

**In-House Obligations** - Obligations reported under this category are for activities performed, or to be performed, by the organizational entity. The work is carried on directly by their own personnel. In addition to personnel costs, also included under In-House are the costs of supplies and equipment essentially of an off-the-shelf nature that are procured for use in In-House research and development, plus such things as travel, publications, and other types of services in support of In-House functions. (Excluded from the In-House entity total are personnel expenses for planning and administering contracts and grants for Out-of-House work.)

**In-House RDT&E Activities** - These Activities are organizational entities which perform at least 25% of their work in any or all of the categories of research, development, test and evaluation (RDT&E). In addition, at least 25% of an Activity's In-House manpower and/or 25% of the obligational authority used In-House is devoted to one or more of the categories of RDT&E.

**MILCON** - This is the total obligational authority for Military Construction appropriations.

**New Capital Equipment - Property Acquisition Cost** - This is the total acquisition cost for new capital equipment (i.e., installed physical plant equipment such as HVAC) acquired in FY94. This amount is also included in the total entry for **Real Property - Property Acquisition Cost**.

**New Scientific & Engineering Equipment - Property Acquisition Cost** - This is the total acquisition cost for new scientific and engineering equipment acquired in FY94, including the cost of newly installed equipment directly related to mission execution, such as lab test equipment. This amount is also included in the total entry for **Equipment - Property Acquisition Cost**.

**Non-DoD In-House/Out-of-House** - This is total obligational authority for all RDTE In-House/Out-of-House not reported under 6.1-6.7, as defined above, including non-Defense funds for work which is conducted In-house/Out-of-House.

## APPENDIX B DEFINITIONS OF REPORT ELEMENTS

**Obligational Authority** - Authority for the financial resources available for obligation in the specific year being reported. This includes unobligated authority carried forward from the prior year and all obligational authority received or made available for obligation in the year being reported, including the unobligated authority which will be carried forward into the following year.

**O&M/Operations & Maintenance In-House/Out-of-House** - This is the total obligational authority for Operations and Maintenance appropriations In-House/Out-of-House, regardless of source.

**Other In-House/Out-of-House** - This is the total obligational authority for all "other" (i.e., not reported elsewhere) appropriations In-House/Out-of-House, regardless of source.

**Out-Of-House Obligations** - Obligations reported under this category are for activities performed, or to be performed, by other than the organizational entity. Out-of-House performers may include other departmental or DoD organizational entities, industrial firms, educational institutions, not-for-profit institutions, and private individuals. Included as Out-of-House work are all expenses paid the Out-of-House performers, as well as the expenses incurred in planning and administering these programs by personnel of the organizational entity. This would also include travel and other supporting services.

**Procurement In-House/Out-of-House** - This is the total obligational authority for procurement appropriations In-House/Out-of-House regardless of source.

**RDT&E** - The sum of the total obligational authority, regardless of source, for both In-House and Out-of-House funding for the following categories:

- Research 6.1
- Innovative Exploratory Development 6.2
- Advanced Development 6.3
- Demonstration and Validation 6.4
- Engineering and Manufacturing Development 6.5
- RDT&E Management Support 6.6
- Operational Systems Development 6.7
- Non-DoD

**Real Property - Property Acquisition Cost** - This is the total acquisition cost of all land, buildings and capital equipment, including the cost of installed physical plant equipment such as HVAC (in excess of \$200) and improvements. This total includes the acquisition cost of new capital equipment. Each reporting Activity is responsible for reporting this information for those facilities assigned to, or leased or occupied by it. An R&D owner will not report this information for the facilities assigned to or occupied by its R&D tenants, as they must report

## APPENDIX B

### DEFINITIONS OF REPORT ELEMENTS

this information separately. This total does not include acreage or real property in buildings rented from private owners.

**Scientists and Engineers** - This generally includes full-time professional government scientific and engineering civilian personnel actively engaged in RDT&E activities. It also includes military professionals, both officer and enlisted, actively engaged in RDT&E activities. Lawyers, accountants, chaplains, social workers, and educators should be excluded.

**PhD's, Military/Civilian** - This is the total number of military (officer and enlisted) and civilian scientists and engineers whose most advanced degree is a doctorate. Degrees must be earned from an accredited college or university. Honorary degrees are excluded.

**Other, Military/Civilian** - This is the total number of military (officer and enlisted) and civilian scientists and engineers who do not hold a doctorate degree, but who are considered professionals. Professionals include full-time Government scientific and engineering personnel actively engaged in RDTE activities. Lawyers, accountants, chaplains, social workers and educators are excluded.

**Space, Admin** - This is the total number of square feet of building space determined to be administrative space (usually that portion occupied by the headquarters staff and excludes scientists', or engineer's offices in a laboratory). Each reporting Activity is responsible for reporting this information for those facilities assigned to, or leased, or occupied by it.

**Space, Lab** - This is the total number of square feet of building space determined to be laboratory space. Each reporting Activity is responsible for reporting this information for those facilities assigned to, or leased, or occupied by it.

**Space, Other** - This is the total number of square feet of all remaining building space. Each reporting Activity is responsible for reporting this information for those facilities assigned to, or leased, or occupied by it.

**Technical Support and Other Personnel** - This generally includes non-professionals working on an RDT&E project or program in support of a professional. In the case of civilians, it includes, but is not limited to, those holding positions that fall into the Civil Service Occupational Groups and Series of Classes, General Schedule. This grouping also includes professional, administrative and clerical personnel in General Schedule and Federal Wage System positions who provide support services in such areas as computers, personnel, technical library, logistics, and facilities.

**Total Funding** - The sum of Total RDT&E, Procurement, Operations & Maintenance and Other.

APPENDIX C  
SELECTED STANDARD ABBREVIATIONS AND  
ACRONYMS

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#### SELECTED STANDARD ABBREVIATIONS AND ACRONYMS

<b>AAM</b>	-	Air-to-Air Missile
<b>AAW</b>	-	Antiair Warfare
<b>ADKEM</b>	-	Advanced Kinetic Energy Missile
<b>ADPE</b>	-	Automatic Data-Processing Equipment
<b>AFDTC</b>	-	Air Force Development Test Center
<b>AGS</b>	-	Armored Gun Systems
<b>AI</b>	-	Artificial Intelligence
<b>AMC</b>	-	US Army Materiel Command
<b>APG</b>	-	Aberdeen Proving Ground
<b>ARDEC</b>	-	Armament Research, Development and Engineering Center
<b>ARIA</b>	-	Advanced Range Instrumentation Aircraft
<b>ASAS</b>	-	All Source Analysis System
<b>ASW</b>	-	Antisubmarine Warfare
<b>ATCCS</b>	-	Army Tactical Command and Control System
<b>ATRJ</b>	-	Advanced Technology Radar Jammer
<b>BFVS</b>	-	Bradley Fighting Vehicle Systems
<b>BW</b>	-	Biological Warfare
<b>C3</b>	-	Command, Control and Communications
<b>C3I</b>	-	Command, Control, Communications and Intelligence
<b>CAD</b>	-	Computer Aided Design
<b>CAE</b>	-	Computer Aided Engineering
<b>CAM</b>	-	Computer Aided Manufacturing
<b>CB</b>	-	Chemical Biological
<b>CBR</b>	-	Chemical, Biological Radiological
<b>CE</b>	-	Chief of Engineers Army
<b>CECOM</b>	-	Communications and Electronics Command
<b>CG</b>	-	Commanding General
<b>CIGTF</b>	-	Central Inertial Guidance Test Facility
<b>CM</b>	-	Countermeasures
<b>CMMCA</b>	-	Cruise Missile Mission Control Aircraft
<b>CNO</b>	-	Chief of Naval Operations
<b>CRREL</b>	-	Cold Regions Research and Engineering Laboratory
<b>CW</b>	-	Chemical Warfare
<b>CWA</b>	-	Chemical Warfare Agents
<b>DA</b>	-	Department of the Army
<b>DARPA</b>	-	Defense Advance Research Projects Agency
<b>DART</b>	-	Demonstration of Advanced Radar Technology
<b>DDN</b>	-	Defense Data Network
<b>DIRCM</b>	-	Directional Infrared Countermeasures
<b>DoD</b>	-	Department of Defense
<b>DPG</b>	-	Dugway Proving Ground
<b>DZ</b>	-	Drop Zone
<b>ECCM</b>	-	Electronic Counter-Countermeasures
<b>ECCM/ARTB</b>	-	Electronic Counter-Countermeasures Advanced Radar Test Bed

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<b>ECM</b>	- Electronic Countermeasures
<b>ECWCS</b>	- Extended Cold Weather Clothing System
<b>EDDIC</b>	- Experimental Design, Demonstration and Integration Center
<b>ELINT</b>	- Electronic Intelligence
<b>EMI</b>	- Electromagnetic Interference
<b>EMP</b>	- Electromagnetic Propagation
<b>EMW</b>	- Electromagnetic Warfare
<b>EO</b>	- Electro-Optical
<b>EO-IR</b>	- Electro-Optics/Infrared
<b>EOD</b>	- Explosive Ordnance Disposal
<b>EPLRS</b>	- Enhanced Position Location Reporting System
<b>ET</b>	- Engineering Artillery
<b>ETDL</b>	- Electronics Technology and Devices Laboratory
<b>EW</b>	- Electronic Warfare
<b>EWTES</b>	- Electronic Warfare Threat Environment Simulation
<b>EWVA</b>	- Electronic Warfare Vulnerability Assessments
<b>FA</b>	- Field Artillery
<b>FAADS</b>	- Forward Area Air Defense Systems
<b>GCA</b>	- Ground-Controlled Approach
<b>GPS</b>	- Global Positioning System
<b>HF</b>	- High-Frequency
<b>HFE</b>	- Human Factors Engineering
<b>HIFX</b>	- High Intensity Flash X-ray
<b>HPM</b>	- High Powered Microwaves
<b>IDF</b>	- Integrated Data Facility
<b>IED</b>	- Innovative Exploratory Development
<b>IEW</b>	- Intelligence Electronic Warfare
<b>IFAST</b>	- Integration Facility for Avionics System Test
<b>IFF</b>	- Identification, Friend or Foe
<b>IIPF</b>	- Intelligence Information Processing Facility
<b>ILIR</b>	- In-Lab Innovative Research
<b>IM</b>	- Insensitive Munitions
<b>IR</b>	- Infrared
<b>IRCM</b>	- Infrared Countermeasures
<b>JDAM</b>	- Joint Direct Attack Munitions
<b>JSOW</b>	- Joint Standoff Weapon
<b>JTIDS</b>	- Joint Tactical Information Distribution System
<b>LEAP</b>	- Lightweight Exo-Atmospheric Projectile
<b>LMCA</b>	- Logistics Material Control Activity
<b>MIRCL</b>	- Mid-Infrared Chemical Laser
<b>MPT</b>	- Military Potential Test
<b>MRSR</b>	- Multi-Role Survivable Radar
<b>MSMS</b>	- Molten Salt Melt Structure
<b>NASC</b>	- Naval Air Systems Command

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<b>NASP</b>	-	National Aerospace Plane
<b>NAVAIR</b>	-	Naval Air Systems Command
<b>NAVSEA</b>	-	Naval Sea Systems Command
<b>NBC</b>	-	Nuclear, Biological and Chemical
<b>NCAC</b>	-	National Center for Advanced Computing
<b>NDT</b>	-	Non-Destructive Testing
<b>NEMP</b>	-	Nuclear Electromagnetic Propagation
<b>NTC</b>	-	National Training Center
<b>NVD</b>	-	Night Vision Devices
<b>OPTEC</b>	-	Operational, Test and Evaluation Command
<b>PEO</b>	-	Program Executive Officer
<b>PI</b>	-	Product Improvement
<b>PLS</b>	-	Palletized Load System
<b>PM</b>	-	Program Manager
<b>PMEL</b>	-	Precision Measurement Equipment Laboratory
<b>POL</b>	-	Petroleum, Oil, Lubricants
<b>QA</b>	-	Quality Assurance
<b>QMDO</b>	-	Qualitative Material Development
<b>R&amp;D</b>	-	Research and Development
<b>RDT&amp;E</b>	-	Research, Development, Test and Evaluation
<b>RESA</b>	-	Research Evaluation and Systems Analysis
<b>RF</b>	-	Radio Frequency
<b>RFPI</b>	-	Rapid Force Projection Initiative
<b>SADARM</b>	-	Search and Destroy Armor
<b>SDI</b>	-	Strategic Defense Initiative
<b>SLED</b>	-	Standard Linear Energy Doubler
<b>STAR</b>	-	Systems Test bed for Avionics Research
<b>T&amp;E</b>	-	Test and Evaluation
<b>TACOM</b>	-	Tank Automotive Command
<b>TAOS</b>	-	Technology for Autonomous Operational Survivability
<b>TASS</b>	-	Tactical Avionics Simulator
<b>TECOM</b>	-	Test and Evaluation Command
<b>TMAS</b>	-	Tank Main Armament System
<b>TRADOC</b>	-	Training and Indoctrination Command
<b>UDT</b>	-	Underwater Demolition Team
<b>USW</b>	-	Undersea Warfare
<b>UV</b>	-	Ultraviolet
<b>V/STOL</b>	-	Vertical/Short Takeoff and Landing
<b>VHF</b>	-	Very High Frequency

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